

The Commitment to  
a Low Carbon Society  
Fiscal 2016 Follow-up Results  
Summary

<Performance in fiscal 2015>

(Tentative translation)

April 24, 2017  
KEIDANREN



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## Introduction

In December 2015, at the twenty-first session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21) held in Paris, France, countries adopted the Paris Agreement, which would become the new framework to replace the Kyoto Protocol. Taking effect in November 2016, the Agreement takes a “pledge and review” approach under which parties pledge “contributions” whose progress is internationally reviewed on a regular basis. It resembles the approach that the Japanese business community has successfully taken over many years through the Keidanren Voluntary Action on the Environment and the Keidanren’s Commitment to a Low Carbon Society.

Japan will need to make nationwide efforts to achieve the emissions reduction target of “26% below 2013 levels by 2030,” as pledged in its Intended Nationally Determined Contribution (INDC), while also balancing “the environment and economy,” as well as contribute to the crafting of detailed rules under the Paris Agreement. Japan should also engage in developing low-carbon technologies and transferring technology overseas to developing countries and other countries with high reduction potential.

Keidanren has made significant accomplishments as a result of running the PDCA cycle every fiscal year and promoting voluntary and proactive efforts on the part of industries and companies since it formulated the Keidanren Voluntary Action Plan on the Environment in 1997. As a result, it successfully reduced average emissions from fiscal 2008 through fiscal 2012 by 12.1% relative to fiscal 1990 levels, thereby substantially overachieving the initial target (see Appendix 1. “Overview of the Keidanren Voluntary Action Plan on the Environment” and Appendix 2. “Achievements of the Keidanren Voluntary Action Plan on the Environment”).

Later in 2013, Keidanren formulated the Commitment to a Low Carbon Society, which expands on the Voluntary Action Plan on the Environment; and therefore, voluntarily and proactively engages in CO<sub>2</sub> emissions reduction. The Commitment to a Low Carbon Society comprises four pillars: (a) “emission reductions from domestic business operations”; (b) “strengthened co-operation with other interested groups” including reductions through products; (c) “contribution at the international level” including the promotion of technology transfers to developing countries; and (d) the “development of innovative technologies” (see figure on next page). As of March 2017, 60 industries and companies have formulated action plans under the Commitment to a Low Carbon Society Phase I (fiscal 2020) and Phase II (fiscal 2030).

In both the Intended Nationally Determined Contribution (INDC), submitted to the UN in July 2015, and the National Plan for Global Warming Countermeasures, adopted by Cabinet Decision in May 2016, the Keidanren’s Commitment to a Low Carbon Society served as a basis

for efforts made in the business community. Under the Japan Revitalization Strategy adopted in June 2016, increased investment in energy efficiency and other solutions to overcome environmental and energy constraints are expected to create promising growing markets. Given the increasingly large role that Keidanren's Commitment to a Low Carbon Society will play in Japanese policy, Keidanren must make maximum efforts to reduce CO<sub>2</sub> emissions under the Commitment to a Low Carbon Society and continue to seek further enhancement of the program's effectiveness, transparency and reliability.

From this perspective, we have compiled the Fiscal 2016 Follow-up Results (Summary) <Performance in 2015>. Details of efforts made by each industry can be found in the "Industry-specific Report".

### Four pillars of Keidanren's Commitment to a Low Carbon Society

#### (1) 2030 emission reduction targets for domestic business operations

Participating industries establish targets based on certain assumptions including maximum deployment of BAT and proactive efforts to save energy.

<Efforts to achieve targets>

- 1) Introducing energy-saving facilities, processes and equipment, etc.: High-efficiency production facilities (incl. power plants), lighting and air conditioning, etc.
- 2) Recovery and effective use of energy: waste heat recovery, etc.
- 3) Fuel conversion: utilization of renewable energy, etc.
- 4) Operational improvements of facilities and equipment: introduction of advanced control equipment

#### (2) Strengthened cooperation with other interested groups

1) Participating industries also contribute to CO<sub>2</sub> emission reductions through the provision of low-carbon products and services.

<Examples>

Improving the fuel economy of transportation equipment by utilizing lightweight and strong material (high tension strength steel, carbon fiber, etc.); promoting energy conservation in the household sector through the diffusion of high-efficiency household appliances; achieving society-wide efficiency by using ICT services, etc.

2) And also promote public campaigns to improve public awareness and knowledge of global warming.

<Examples>

Providing information on the environmental performance of a product; promoting eco-drive

#### (3) Promoting contribution at the international level

1) Participating industries contribute to CO<sub>2</sub> reductions at the global level by proactively transferring Japan's advanced technologies and know-how to developing countries.

<Examples>

Emissions of approximately 0.65-1.02 billion t-CO<sub>2</sub> (estimate) will be potentially avoided globally in 2030 due to the deployment of high-efficiency power generation by Japanese companies

2) Activity at international conferences, including cooperation towards the formulation of international standards and introduction of Japan's diverse global warming countermeasures

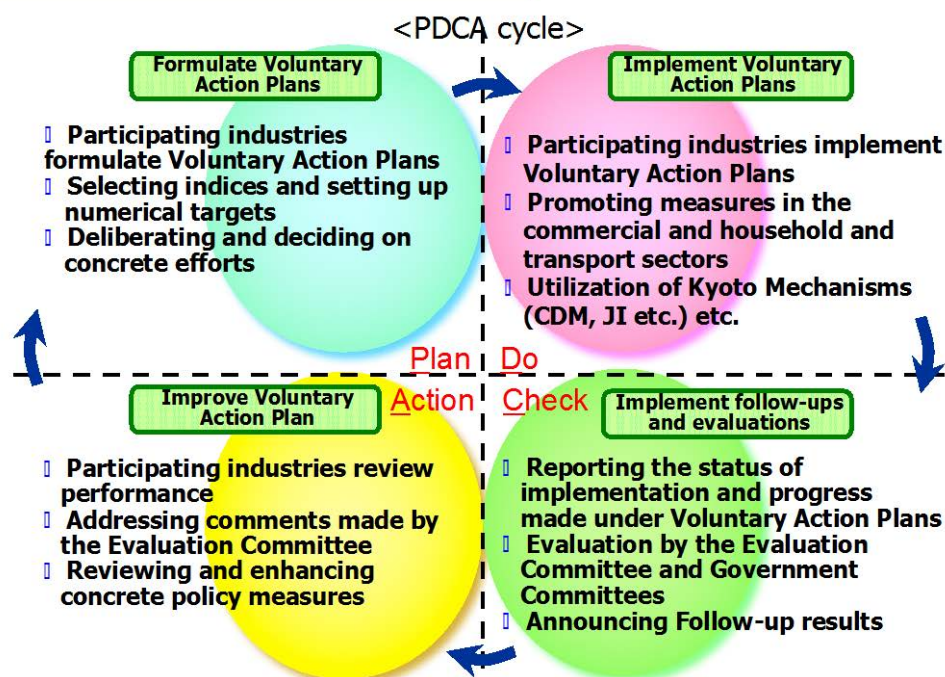
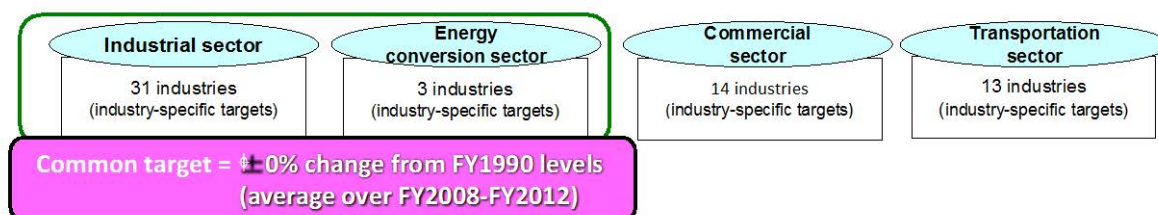
#### (4) 2030 emission reduction targets for domestic business operations

Participating industries engage in developing and commercializing innovative technology with a medium- to long-term view reaching beyond 2030.

<Examples>

- 1) Developing energy-saving facilities, processes and equipment, etc.: energy-saving cement production processes, artificial photosynthesis, environment-friendly iron-making process, CCS etc.
- 2) Fuel conversion: biofuels, hydrogen energy, etc.
- 3) Developing low-carbon products and services: innovative materials (incl. utilization of biomass), ZEB/ZEH, next-generation vehicles, ITS, superconducting cables, etc.

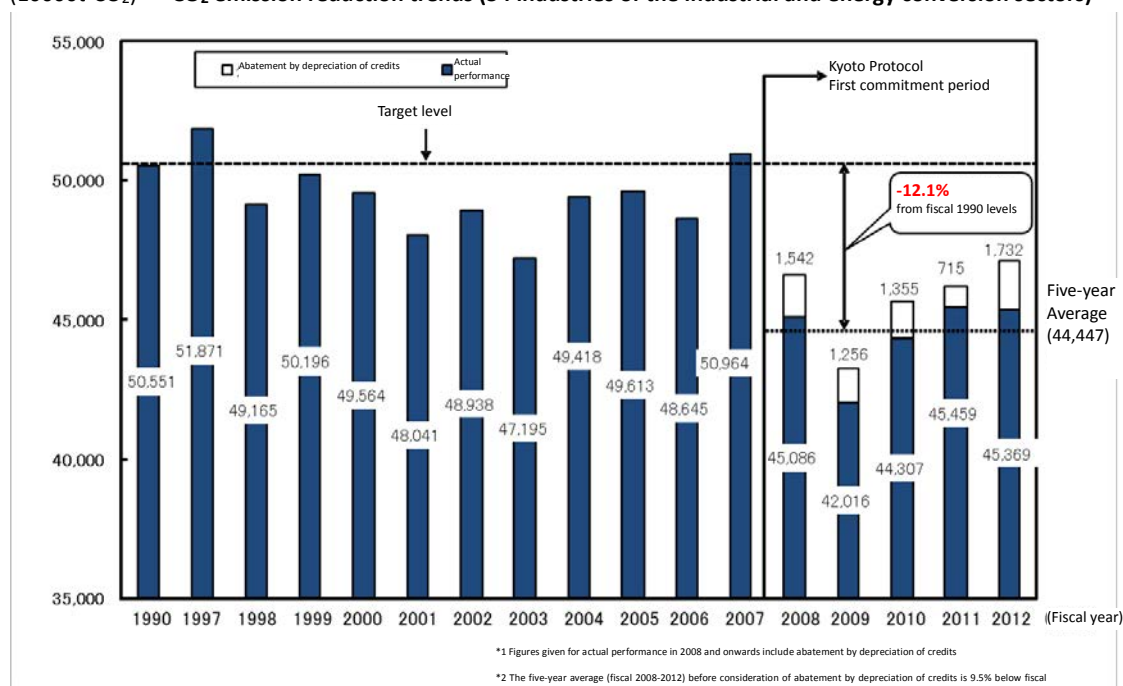
# 1. Overview of the KEIDANREN Voluntary Action Plan on the Environment (Section on Global Warming Measures) (fiscal 1997-2012)



## 2. Accomplishments of the KEIDANREN Voluntary Action Plan on the Environment (Section on Global Warming Measures)

◆As a result of efforts made under the Voluntary Action Plan on the Environment, emissions were reduced by 12.1% relative to fiscal 1990 levels during the first commitment period (2008-2012) of the Kyoto Protocol

(10000t-CO<sub>2</sub>) CO<sub>2</sub> emission reduction trends (34 industries of the industrial and energy conversion sectors)



### 3. History of the Voluntary Action Plan on the Environment (Section on Global Warming Measures) and the Commitment to a Low Carbon Society

April 1991	Announced the Keidanren Global Environment Charter
June 1992	UN Earth Summit (Rio de Janeiro)
July 1996	Announced the Keidanren Appeal on Environment (declared the formulation of the Voluntary Action Plan on the Environment)
June 1997	<b>Announced the Keidanren Voluntary Action Plan on the Environment</b> The industrial and energy conversion sectors set up targets to “endeavor to reduce CO <sub>2</sub> emissions from the industrial and energy conversion sectors in 2010 (later changed to average of fiscal 2008-2012) to below fiscal 1990. =>achieved reductions of 12.1% (Fiscal 2013 follow-up results)
Dec. 1997	Adoption of the Kyoto Protocol (COP3)
Dec. 1998	First follow-up to the Voluntary Action Plan on the Environment (continued on an annual basis)
July 2002	Launched the Evaluation Committee for the Voluntary Action Plan on the Environment
April 2005	Cabinet Decision on the “Kyoto Protocol Target Achievement Plan”
March 2008	Cabinet Decision on the “Kyoto Protocol Target Achievement Plan (revised)” “the voluntary action plans of <i>Nippon Keidanren</i> are, in particular, playing a central role in countermeasures in the industrial community. The advantages of a voluntary instrument include the ease of selection of superior countermeasures for each actor based on its originality and ingenuity, the likelihood of providing incentives to pursue aggressive targets, and no procedural costs for both the Government and implementing actors. It is expected that these advantages will be further exploited in voluntary action plans by business operators.”
Dec. 2009	Announced the Commitment to a Low Carbon Society Phase I (Basic Concept) (2020 target)
Jan. 2013	<b>Formulated and announced the Commitment to a Low Carbon Society Phase I (2020 target)</b> => as of October 2015, 57 industries and companies have formulated action plans
March 2013	Interim policy on global warming (Global Warming Prevention Headquarters decision) “In terms of sector-specific measures to cope with CO <sub>2</sub> emissions of energy origin, voluntary approaches taken by businesses participating in the Commitment to a Low Carbon Society shall undergo evaluation and verification, and institutional measures, including the formulation, announcement and implementation of guidelines on emission regulation, and various support measures shall be promoted.”
April 2013	Launched Keidanren’s Commitment to a Low Carbon Society
July 2014	Invited industries to formulate action plans under the Keidanren Commitment to a Low Carbon Society Phase II (2030 target)
April 2015	<b>Formulated and announced the Commitment to a Low Carbon Society Phase II (2030 target)</b> => as of October 2015, 54 industries and companies have formulated action plans
July 2015	Finalization of Japan’s Intended Nationally Determined Contribution by the Japanese



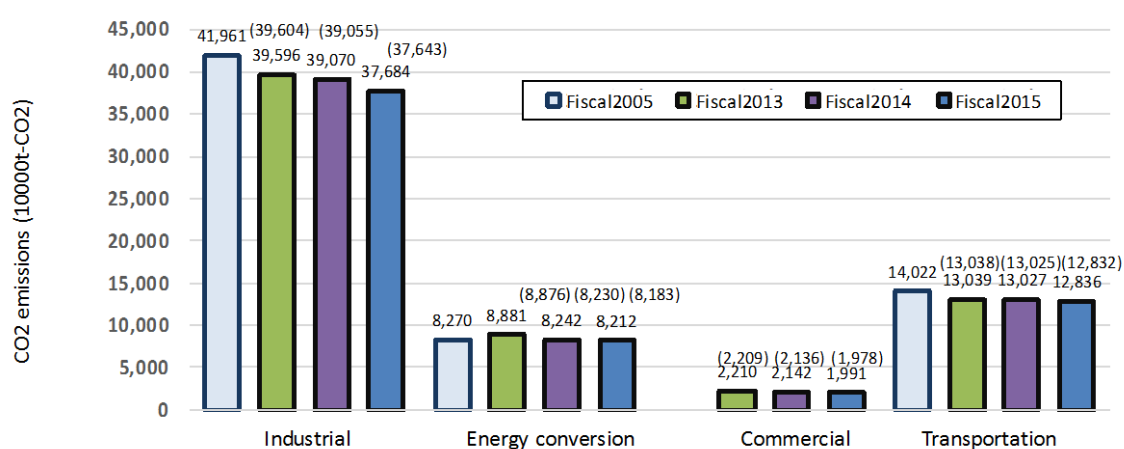
Government and submission to the UN

Dec.2015	Included the Commitment to a Low Carbon Society among “Measures which form the basis for the bottom-up calculation of the GHG emission reduction target.”
May 2016	Adopted the Paris Agreement (COP21)
	Cabinet Decision on the National Plan for Global Warming Countermeasures
	Documentation of intentions to “continue to give business-led voluntary approaches a central role in industrial efforts to cope with climate change countermeasures” under “Promoting voluntary approaches in the business community”.
Nov. 2016	Entry into force of the Paris Agreement
Nov. 2016	Ratification of the Paris Agreement by the Japanese government

## 1. Pillar 1: Emission reductions from domestic business operations

The Fiscal 2016 Follow-up revealed that in fiscal 2015, CO<sub>2</sub> emissions were reduced in all sectors (industrial, energy conversion<sup>1,2</sup>, commercial, and transportation) relative to the previous fiscal year (fiscal 2014), fiscal 2013 the baseline year of Japan's INDC and fiscal 2005 (with the exception of the commercial sector)<sup>3</sup> (Figure 1; Attachment 1).

Figure 1. CO<sub>2</sub> emissions by sector and rate of reduction (final count)



Sector	Industries/ companies	CO <sub>2</sub> emissions in fiscal 2015	Relative to previous fiscal year (fiscal 2014)	Relative to fiscal 2013	Relative to fiscal 2005
Industrial	31 industries	376.84 Mil t-CO <sub>2</sub>	-3.5%	-4.8%	-10.4%
Energy conversion	3 industries	82.12 Mil t-CO <sub>2</sub>	-0.4%	-7.5%	-0.7%
Commercial	13 industries	19.91 Mil t-CO <sub>2</sub>	-7.1%	-9.9%	-
Transportation	12 industries /companies	128.36 Mil t-CO <sub>2</sub>	-1.5%	-1.6%	-11.1%

<sup>1</sup> Emissions from power used at power generation plants and oil and gas product manufacturers and transmission and distribution loss. CO<sub>2</sub> emissions from firing fuels for power generation are counted in the respective electricity end-use sectors. However, it should be noted that the action plan for the Electric Power Council for a Low Carbon Society includes CO<sub>2</sub> emissions from firing fuels for power generation.

<sup>2</sup> Figures for the energy conversion sector through fiscal 2014 are provided as reference. (Electric power-related performance through fiscal 2014 represent the performance of the twelve member companies of the Federation of Electric Power Companies while figures for fiscal 2015 represent the performance of 39 companies, including PPS, that are members of the Electric Power Council for a Low Carbon Society that conducted business operations in fiscal 2015.)

<sup>3</sup> Emissions in the commercial sector have been excluded due to unsatisfactory data collection status.

(Notes)

- Data for fiscal 2005 have been collected based on the calculation method employed under the Commitment to a Low Carbon Society for comparison purposes.
- Emissions in the commercial sector in fiscal 2005 are not provided due to unsatisfactory data collection status.
- CO<sub>2</sub> emissions reflecting the decrease resulting from using post-adjustment emission coefficients stipulated in the Act on the Promotion of Global Warming Countermeasures are provided in brackets.

An analysis was conducted on contributing factors of increases and decreases in CO<sub>2</sub> emissions compared with the previous fiscal year and fiscal 2013 levels (Table 1). It was revealed that in all sectors, CO<sub>2</sub> emissions were reduced due to “② change in CO<sub>2</sub> emission factor (change in CO<sub>2</sub> emissions due to energy decarbonization).” This was presumably due mainly to a drop in the CO<sub>2</sub> emission factor of purchased electricity<sup>4</sup> resulting from changes in the power mix, including an increase in non-fossil power sources from conversion to low-carbon fuels, such as renewable energy, and the restarting of some nuclear power plants.

Emissions due to “③ change in energy consumed per unit of economic activity (change in CO<sub>2</sub> emissions due to energy saving efforts)” decreased relative to the previous fiscal year in the industrial and commercial sectors but increased in the energy conversion<sup>5</sup> and transportation sectors. Compared to fiscal 2013 levels, a decrease was observed in all sectors except for the industrial sector, which experienced a slight increase of 0.1% (see respective sections hereinafter for details for each sector). On the other hand, improvements were seen in all sectors (excluding the commercial sector) relative to fiscal 2005; and therefore, in the medium- to long-term the Japanese business community is making progress towards reducing CO<sub>2</sub> emissions through its energy saving efforts.

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<sup>4</sup> CO<sub>2</sub> emission factors for electric power were 5.67 t-CO<sub>2</sub>/10000kWh, 5.53 t-CO<sub>2</sub>/10000kWh and 5.34 t-CO<sub>2</sub>/10000kWh for fiscal years 2013, 2014 and 2015 respectively. (All figures are final, but those representing fiscal years before the establishment of the Electric Power Council for a Low Carbon Society in fiscal 2014 are referential. (Includes for power producers and suppliers (PPS). Source: Electric Power Council for a Low Carbon Society)

<sup>5</sup> Comparison with reference values. See footnote 2 and the section on energy conversion sector for details

Table 1. Analysis of contributing factors to changes in CO<sub>2</sub> emissions from the industrial sector in fiscal 2015 (relative to fiscal years 2014, 2013, 2005) <sup>\*1</sup>

Sector	Contributing factors to changes in CO <sub>2</sub> emissions	Relative to previous year (relative to fiscal 2014)	Relative to fiscal 2013	Relative to fiscal 2005
Industrial <sup>*2</sup>	① Change in economic activity <sup>*3</sup>	-2.9%	-4.0%	-9.9%
	② Change in CO <sub>2</sub> emission factor <sup>*4</sup>	-0.6%	-0.8%	+3.5%
	③ Change in energy consumed per unit of economic activity	-0.02%	+0.1%	-4.0%
	Change in CO <sub>2</sub> emissions (①+②+③)	-3.5%	-4.8%	-10.4%
Energy conversion (Reference)	① Change in economic activity	+1.4%	-2.1%	-6.1%
	② Change in CO <sub>2</sub> emission factor	-2.7%	-2.5%	+14.4%
	③ Change in energy consumed per unit of economic activity	+0.9%	-2.9%	-9.0%
	Change in CO <sub>2</sub> emissions (①+②+③)	-0.4%	-7.5%	-0.7%
Commercial	① Change in economic activity	+0.1%	+0.4%	-
	② Change in CO <sub>2</sub> emission factor	-3.3%	-5.6%	-
	③ Change in energy consumed per unit of economic activity	-3.9%	-4.8%	-
	Change in CO <sub>2</sub> emissions (①+②+③)	-7.1%	-9.9%	-
Transportation <sup>*5</sup>	① Change in economic activity	-3.8%	-0.4%	+7.9%
	② Change in CO <sub>2</sub> emission factor	-0.2%	-0.4%	+2.3%
	③ Change in energy consumed per unit of economic activity	+2.5%	-0.8%	-21.3%
	Change in CO <sub>2</sub> emissions (①+②+③)	-1.5%	-1.6%	-11.1%

\* 1 Due to the rounding of values to two decimal places, totals may differ from the sum of individual items.

\* 2 Comparisons with fiscal 2005 performance due not include data for the Shipbuilders' Association of Japan.

\* 3 Indices with the closest relation to energy consumption were selected to represent each industry's economic activity in each industry.

\* 4 CO<sub>2</sub> emissions per unit of heat output have been used for fuel, and CO<sub>2</sub> emissions per unit of power output, for electricity.

\* 5 Comparisons with fiscal 2005 performance do not include data for the Association of Japanese Private Railways or the East Japan Railway Company.

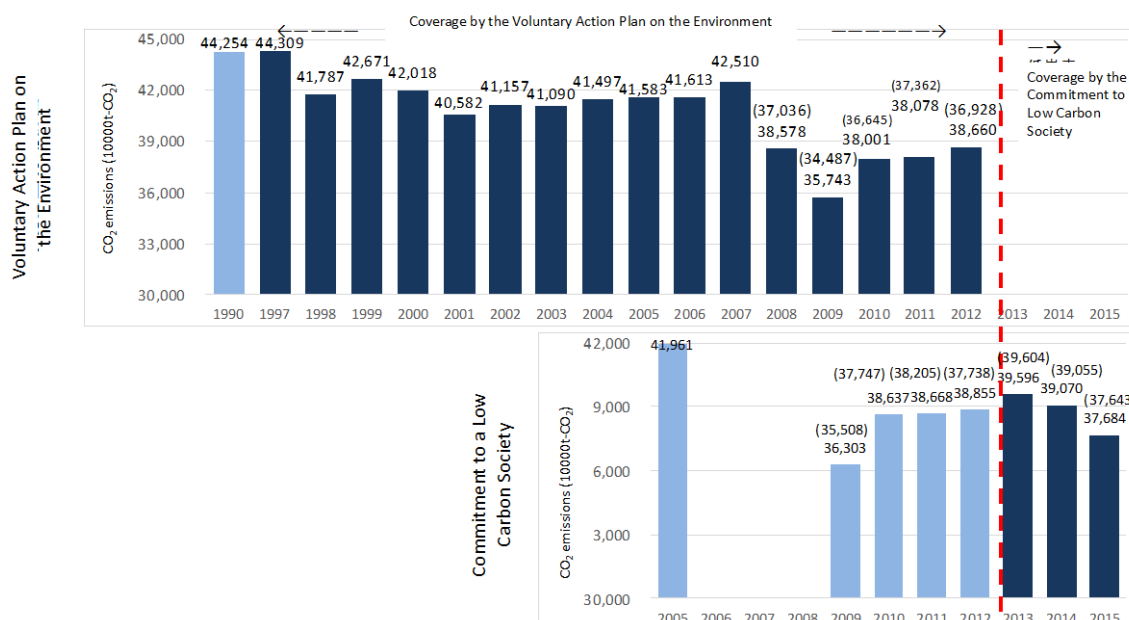
## (1) Industrial Sector

### A. Performance

The Fiscal 2016 Follow-up revealed that in the industrial sector, industries participating in the Commitment to a Low Carbon Society followed a downward emission trend in fiscal 2015, emitting 376.84 million t-CO<sub>2</sub>, which was 3.5% (13.86 million t-CO<sub>2</sub>) below previous fiscal year levels, 4.8% (19.12 million t-CO<sub>2</sub>) below fiscal 2013 levels and 10.4% (42.77 million t-CO<sub>2</sub>)<sup>6</sup> below fiscal 2005 levels (Figure 2).

Industries of the industrial sector participating in the Commitment to a Low Carbon Society emitted 390.70 million t-CO<sub>2</sub> in fiscal 2014, accounting for around 83% of total emissions from Japan's industrial sector as a whole (472.02 million t-CO<sub>2</sub> in fiscal 2014)<sup>7</sup>.

Figure 2. CO<sub>2</sub> emissions in the industrial sector



#### (Notes)

- The Voluntary Action Plan on the Environment was implemented through fiscal 2012 and succeeded by the Commitment to a Low Carbon Society from fiscal 2013. The figures for fiscal 2005-2012 under the Commitment to a Low Carbon Society have been calculated and provided as reference.
- Calculation methods have been renewed with the implementation of the Commitment to a Low Carbon Society. (Used generation-end coefficients instead of receiving end emission coefficients; set revised industrial boundaries in some industries).
- The CO<sub>2</sub> emission figures for the electrical and electronics industry in fiscal 2011 and preceding years given for the Commitment to a Low Carbon Society represent figures from the Voluntary Action Plan on the Environment. (The industry had already used receiving end coefficients, but boundaries have been adapted.). Emissions from the Shipbuilders' Association of Japan are not included in the figures for fiscal years prior to 2012.

<sup>6</sup> Comparisons with fiscal 2005 levels have been calculated excluding data for the Shipbuilders' Association of Japan.

<sup>7</sup> CO<sub>2</sub> emissions for the "Industries Sector" and "Industrial Processes" in "GHG Emissions Data of Japan" (final count for 1990-2014, National Institute for Environmental Studies). "Industries Sector" also includes agriculture, forestry and fisheries.

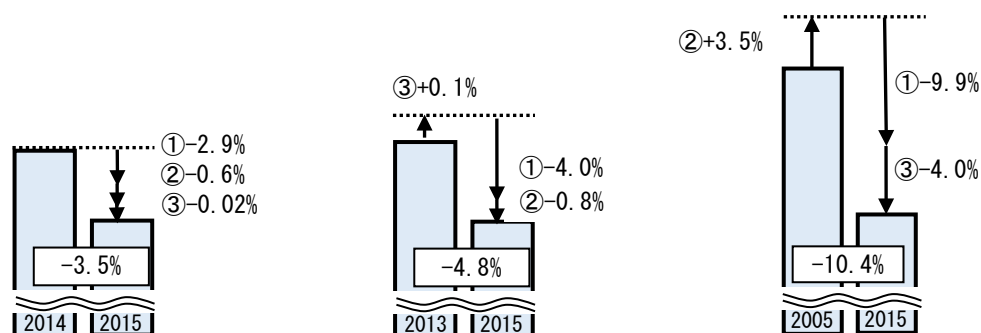
- CO<sub>2</sub> emissions reflecting the decrease resulting from using post-adjustment emission coefficients stipulated in the Act on the Promotion of Global Warming Countermeasures are provided in brackets.

## B. Factor analysis

A factor analysis of the causes that led to CO<sub>2</sub> emission reductions (Figure 3) revealed that CO<sub>2</sub> emissions decreased due to “③ change in energy consumed per unit of economic activity” by 0.02% relative to the previous year and increased by 0.1% relative to fiscal 2013, remaining roughly flat during the last two years. This is presumably because despite energy efficiency improvements in multiple industries, including the automobile, chemical and paper manufacturing industries, some industries experiencing slower economic (production) activity could not fully reduce the more constant CO<sub>2</sub> emissions that are difficult to control even amid smaller production activity. Energy efficiency changes accompanying changes in business structure may also have affected emissions.

In contrast, in comparison to fiscal 2005 levels, CO<sub>2</sub> emissions dropped by 4.0% due to “③ change in energy consumed per unit of economic activity,” and thus it can be said that energy efficiency improvements are being achieved in the medium to long term.

Figure 3. Factors of changes in emissions in the industrial sector (relative to previous fiscal year and fiscal years 2013 and 2005) <sup>\*1</sup>



	Relative to previous fiscal year (fiscal 2014)	Relative to fiscal 2013	Relative to fiscal 2005 <sup>*4</sup>
① Change in economic activity <sup>*2</sup>	-2.9% (-2.9%)	-4.0% (-4.1%)	-9.9% (-9.9%)
② Change in CO <sub>2</sub> emission factor <sup>*3</sup>	-0.6% (-0.7%)	-0.8% (-1.0%)	+3.5% (+3.4%)
③ Change in energy consumed per unit of economic activity	-0.02% (-0.02%)	+0.1% (+0.1%)	-4.0% (-4.0%)
Total	-3.5% (-3.6%)	-4.8% (-5.0%)	-10.4% (-10.4%)

<sup>\*1</sup> Due to the rounding of values to two decimal places, totals may differ from the sum of individual items.

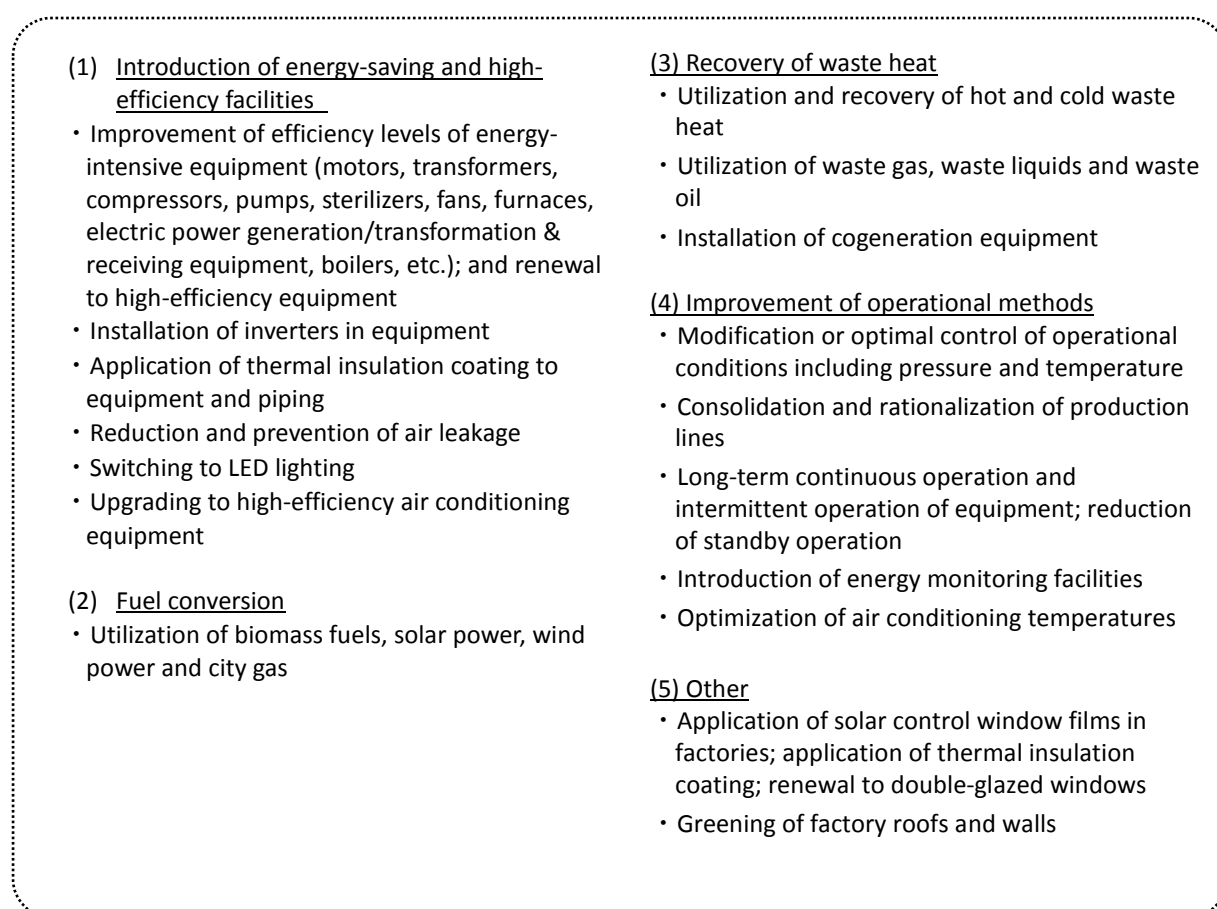
CO<sub>2</sub> emissions reflecting the decrease resulting from using post-adjustment emission coefficients stipulated in the Act on the Promotion of Global Warming Countermeasures are provided in brackets.

- \* 2 Indices with the closest relation to energy consumption were selected to represent each industry's economic activity.  
 \* 3 CO<sub>2</sub> emissions per unit of heat output have been used for fuel, and CO<sub>2</sub> emissions per unit of power output, for electricity.  
 \* 4 Data for the Shipbuilders' Association of Japan are not included in the figure provided relative to fiscal 2005.

### C. Efforts made in fiscal 2015

The industrial sector continues to invest in improving the energy efficiency of facilities through efficiency improvements and renewing energy-intensive facilities. Furthermore, in fiscal 2015, industries reported new approaches, including employing sensors that automatically control the unnecessary operation of machinery (Figure 4).

Figure 4. Examples of efforts made in the industrial sector in fiscal 2014



### (2) Energy conversion sector

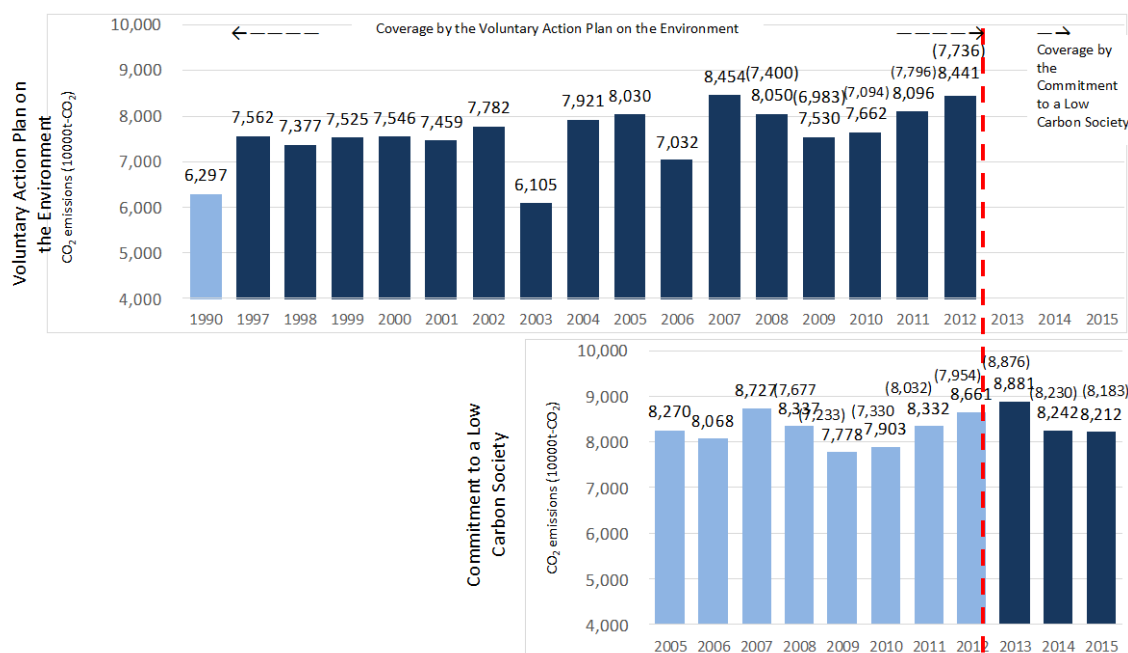
#### A. Performance

The Fiscal 2016 Follow-up revealed that in the energy conversion sector, industries participating in the Commitment to a Low Carbon Society followed a downward emission trend in fiscal 2015, emitting 82.12 million t-CO<sub>2</sub>, which was 0.4% (0.3 million t-CO<sub>2</sub>) below previous fiscal year levels, 7.5% (6.69 million t-CO<sub>2</sub>) below fiscal 2013 levels and 0.7% (0.58 million t-

CO<sub>2</sub>) below fiscal 2005 levels (Figure 5).

Industries of the energy conversion sector participating in the Commitment to a Low Carbon Society emitted 82.42 million t-CO<sub>2</sub> in fiscal 2014, accounting for around 88% of total emissions from Japan's energy conversion sector as a whole (93.66 million t-CO<sub>2</sub> in fiscal 2014)<sup>8</sup>.

Figure 5. CO<sub>2</sub> emissions in the energy conversion sector



(Notes)

- The Voluntary Action Plan on the Environment was implemented through fiscal 2012 and succeeded by the Commitment to a Low Carbon Society from fiscal 2013.  
The figures for fiscal 2005-2012 under the Commitment to a Low Carbon Society have been calculated and provided as reference.
- Calculation methods have been renewed with the implementation of the Commitment to a Low Carbon Society. (Used generation-end coefficients instead of receiving end emission coefficients to; set revised industrial boundaries in some industries).
- The CO<sub>2</sub> emission figures for the Electric Power Council for a Low Carbon Society represent the sum of emissions from power used in power generation plants as well as transmission and distribution loss.  
It should be noted that emissions from fuels converted to electric power are included in emissions in the industrial sector.
- Figures through fiscal 2014 represent the performance of twelve companies associated with the Federation of Electric Power Companies. The figures for fiscal 2015 represent the performance of 39 companies, including PPS, participating in the Electric Power Council for a Low Carbon Society that conducted business operations in fiscal 2015. (note: industrial boundaries have been revised)
- CO<sub>2</sub> emission figures from the Voluntary Action Plan on the Environment (note: industrial boundaries have been revised) have been used to represent the Japan Gas Association in fiscal 2012 and preceding years for the Commitment to a Low Carbon Society.
- CO<sub>2</sub> emissions reflecting the decrease resulting from using post-adjustment emission coefficients stipulated in the Act on the Promotion of Global Warming Countermeasures are provided in brackets.

<sup>8</sup> Source: CO<sub>2</sub> emissions for the Energy Conversion Sector” in “GHG Emissions Data of Japan” (final count for 1990-2014, National Institute for Environmental Studies).



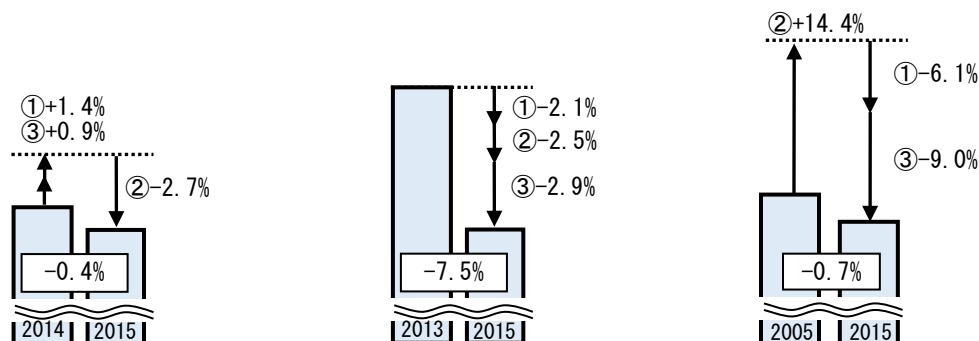
## B. Factor analysis

It should be noted that the factor analysis of reduced CO<sub>2</sub> emissions in fiscal 2015 (Figure 6) uses values defined by different boundaries for electric power business operations through fiscal 2014 and for those in fiscal 2015 (see notes for Figure 5).

Acknowledging that comparisons can only be made with reference values, CO<sub>2</sub> emissions due to “③ change in energy consumed per unit of economic activity” slightly increased (by 0.9%) relative to the previous fiscal year, presumably because of boundary changes for electric power business operations. In contrast, compared to fiscal 2013 levels, emissions were reduced by 2.9% despite such incremental factors, presumably as a result of efficiency improvements in power transmission/distribution and generation facilities, oil refinery facilities and city gas production facilities.

Furthermore, in terms of “② change in CO<sub>2</sub> emission factor,” the CO<sub>2</sub> emission factor was smaller relative to the previous year and relative to fiscal 2013 by 2.7% and 2.5%, respectively. Changes in the power mix, as aforementioned, accompanied by a shift in the fuels used for gas production could be contributing factors.

Figure 6. Factors of changes in emissions in the energy conversion sector (reference) <sup>\*1</sup>  
(relative to previous fiscal year and fiscal years 2013 and 2005)



	Relative to previous fiscal year (fiscal 2014)	Relative to fiscal 2013	Relative to fiscal 2005
① Change in economic activity <sup>*2</sup>	+1.4% (+1.4%)	-2.1% (-2.1%)	-6.1% (-6.1%)
② Change in CO <sub>2</sub> emission factor <sup>*3</sup>	-2.7% (-2.9%)	-2.5% (-2.8%)	+14.4% (+14.0%)
③ Change in energy consumed per unit of economic activity	+0.9% (+0.9%)	-2.9% (-2.9%)	-9.0% (-9.0%)
<b>Total</b>	<b>-0.4%</b> <b>(-0.6%)</b>	<b>-7.5%</b> <b>(-7.8%)</b>	<b>-0.7%</b> <b>(-1.1%)</b>

<sup>\*1</sup> Due to the rounding of values to two decimal places, totals may differ from the sum of individual items.

CO<sub>2</sub> emissions reflecting the decrease resulting from using post-adjustment emission coefficients stipulated in the Act

on the Promotion of Global Warming Countermeasures are provided in brackets.

\* 2 Indices with the closest relation to energy consumption were selected to represent each industry's economic activity.

\* 3 CO<sub>2</sub> emissions per unit of heat output have been used for fuel, and CO<sub>2</sub> emissions per unit of power output, for electricity.

### C. Efforts made in fiscal 2015

The energy conversion sector also continues to invest in efficiency improvements and the renewal of facilities, as does the industrial sector. Furthermore, it engages in efforts to recover waste energy, including waste heat, atmospheric heat and hydrogen (Figure 8).

Figure 7. Examples of efforts made in the energy conversion sector in fiscal 2015

<u>(1) Introduction of energy-saving and high-efficiency facilities</u>	<u>(3) Recovery of waste energy</u>
<ul style="list-style-type: none"> <li>• Installation and modification of high-efficiency power generating equipment (Introduction of high-efficiency power transmission/distribution equipment, renewal to high-efficiency turbines, introduction of heat pumps and cogeneration, etc.)</li> <li>• Renewal of steam traps</li> <li>• Motorization</li> <li>• Installation of inverters in pumps</li> <li>• Renewing indoor equipment to high-efficiency models (switching to LED lighting, upgrading air conditioning equipment)</li> </ul>	<ul style="list-style-type: none"> <li>• Installation of heat exchangers</li> <li>• Mutual use of heat</li> <li>• Recovery of waste heat, atmospheric heat, etc.</li> <li>• Promotion of hydrogen recovery</li> </ul>
<u>(2) Fuel conversion</u>	<u>(4) Improvement of operational methods</u>
<ul style="list-style-type: none"> <li>• Utilization of micro-hydropower, solar, wind power</li> </ul>	<ul style="list-style-type: none"> <li>• Promotion of computer controls (flow control, etc.)</li> <li>• Integration of a number of equipment (integration of boilers)</li> <li>• Efficient utilization of steam</li> <li>• Changing LNG/LPG pump operations</li> <li>• Reduction of natural gas vapor release</li> <li>• Changing the offloading temperature at LPG offloading equipment</li> </ul>

### (3) Commercial Sector

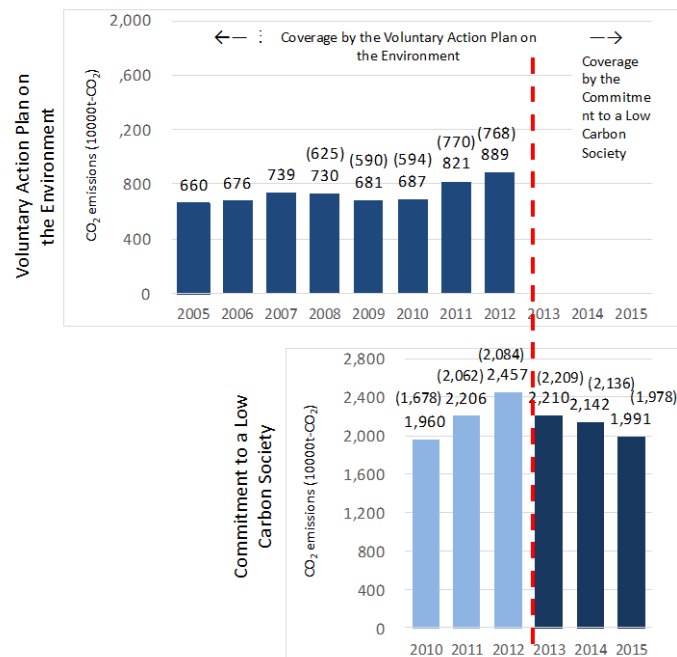
#### A. Performance

The Fiscal 2016 Follow-up revealed that in the commercial sector, industries participating in the Commitment to a Low Carbon Society followed a downward emission trend in fiscal 2015, emitting 19.91 million t-CO<sub>2</sub>, which was 7.1% (1.51 million t-CO<sub>2</sub>) below previous fiscal year levels and 9.9% (2.20 million t-CO<sub>2</sub>) below fiscal 2013 levels (Figure 8).

Industries of the commercial sector participating in the Commitment to a Low Carbon Society emitted 21.42 million t-CO<sub>2</sub> in fiscal 2014, accounting for around 8.2% of total emissions from Japan's commercial sector as a whole (260.94 million t-CO<sub>2</sub> in fiscal 2014)<sup>9</sup>.

<sup>9</sup> CO<sub>2</sub> emissions for the "Commercial and Other (Tertiary) Sector" in "GHG Emissions Data of Japan" (final count for 1990-2014, National Institute for Environmental Studies). Includes data for academic, medical and public

Figure 8. CO<sub>2</sub> emissions in the commercial sector



(Notes)

- The Voluntary Action Plan on the Environment was implemented through fiscal 2012 and succeeded by the Commitment to a Low Carbon Society from fiscal 2013. The figures for fiscal 2010-2012 under the Commitment to a Low Carbon Society have been calculated and provided as reference.
- Calculation methods have been renewed with the implementation of the Commitment to a Low Carbon Society. (Used generation-end coefficients instead of receiving end emission coefficients to; set revised industrial boundaries in some industries).
- Emissions from the Real Estate Companies Association of Japan are not included.
- CO<sub>2</sub> emissions reflecting the decrease resulting from using post-adjustment emission coefficients stipulated in the Act on the Promotion of Global Warming Countermeasures are provided in brackets.

## B. Factor analysis

A factor analysis of the causes that led to CO<sub>2</sub> emission reductions (Figure 9) revealed that overall CO<sub>2</sub> emissions decreased despite a slight increase due to “① change in economic activity” relevant to previous fiscal year and fiscal 2013 (increases by 0.1% and 0.4%, respectively), owing to “② change in CO<sub>2</sub> emission factor (decarbonization of energy)” (reductions by 3.3% and 5.6%, respectively) and “③ change in energy consumed per unit of economic activity” (reductions by 3.9% and 4.8%, respectively).

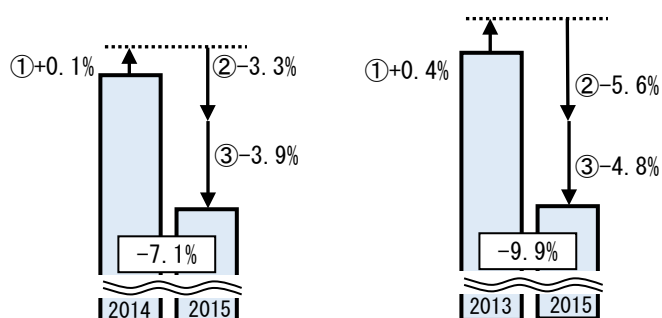
The commercial sector observed “② change in CO<sub>2</sub> emission factor (decarbonization of energy)” because electric power represents a large portion of the energy used in the sector; and therefore, it is greatly affected by changes in the electric power mix (increased share of non-fossil fuels due to conversion to low-carbon fuels and partial restarting of nuclear power plants).

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office sectors.

Furthermore, renewing equipment to energy-efficient models and engaging in continued energy-saving efforts, as well as establishing power-saving practices at stores and offices have contributed to reducing emissions due to “③ change in energy consumed per unit of economic activity.”

Figure 9. Factors of changes in emissions in the commercial sector  
(relative to previous fiscal year and fiscal year 2013) \*<sup>1</sup>



	Relative to previous fiscal year (fiscal 2014)	Relative to fiscal 2013
① Change in economic activity * <sup>2</sup>	+0.1% (+0.1%)	+0.4% (+0.4%)
② Change in CO <sub>2</sub> emission factor * <sup>3</sup>	-3.3% (-3.6%)	-5.6% (-6.1%)
③ Change in energy consumed per unit of economic activity	-3.9% (-3.9%)	-4.8% (-4.8%)
Total	-7.1% (-7.4%)	-9.9% (-10.5%)

\* 1 Due to the rounding of values to two decimal places, totals may differ from the sum of individual items.

CO<sub>2</sub> emissions reflecting the decrease resulting from using post-adjustment emission coefficients stipulated in the Act on the Promotion of Global Warming Countermeasures are provided in brackets.

\* 2 Indices with the closest relation to energy consumption were selected to represent each industry's economic activity.

\* 3 CO<sub>2</sub> emissions per unit of heat output have been used for fuel, and CO<sub>2</sub> emissions per unit of power output, for electricity.

### C. Efforts made in fiscal 2015

The commercial sector continues to engage in efforts centered on energy efficiency measures in buildings, including newly installing or renewing existing equipment and appliances to high-efficiency/energy-saving models, such as LED lighting and high-performance air conditioning equipment. Furthermore, in fiscal 2015, the sector introduced IT systems, including Building Energy Management Systems (BEMS) and automatic light off systems (Figure 10).

Figure 10. Examples of efforts made in the commercial sector in fiscal 2015

<p>(1) <u>Introduction of energy-saving and high-efficiency facilities</u></p> <ul style="list-style-type: none"> <li>• Introduction of Building Energy Management Systems (BEMS)</li> <li>• Renewal and upgrades of HVAC systems, elevators, communication devices, transformers, compressors, pumps, freezers and refrigerators, kitchen equipment to high energy efficiency models.</li> <li>• Installation of inverters</li> <li>• Introduction and renewal of total heat exchangers</li> <li>• Introduction of automatic light off systems</li> <li>• Renewal of office, stores and advertising displays to LED lighting</li> <li>• Connecting servers and routers to DC power sources</li> <li>• Introduction of heat pumps</li> </ul>	<p>(3) <u>Improvement of operational methods</u></p> <ul style="list-style-type: none"> <li>• Changing of refrigerator and freezer temperatures</li> <li>• Suspension of overdue equipment</li> <li>• Streamlining of networks</li> <li>• Introduction of automatic control systems in heat source equipment</li> <li>• Intermittent operation of air conditioners and appliances (lighting, office appliances, commercial equipment, elevators, toilets, etc.)</li> <li>• Optimization of air conditioning temperatures, strict maintenance</li> <li>• Introduction of human body sensors</li> </ul>
<p>(2) <u>Fuel conversion</u></p> <ul style="list-style-type: none"> <li>• Utilization of solar and wind power</li> </ul>	<p>(4) <u>Other</u></p> <ul style="list-style-type: none"> <li>• Promotion of energy-saving efforts through the acquisition of ISO14001 certification</li> <li>• Greening of factory roofs and walls (green curtains, etc.)</li> </ul>

#### D. Relevant efforts made in main and local offices by non-commercial industries

The energy-saving efforts pursued in buildings of the commercial sector are also performed in the industrial, energy conversion and transportation sectors, where industries have engaged in various efforts, including switching to LED lighting, consolidating offices, strictly managing heating and cooling temperatures, adopting the Cool Biz dress code and installing high-efficiency energy-saving facilities. These efforts have led to the reduction of CO<sub>2</sub> emissions per unit of floor area compared to previous fiscal year levels in many industries.

#### (4) Transportation Sector

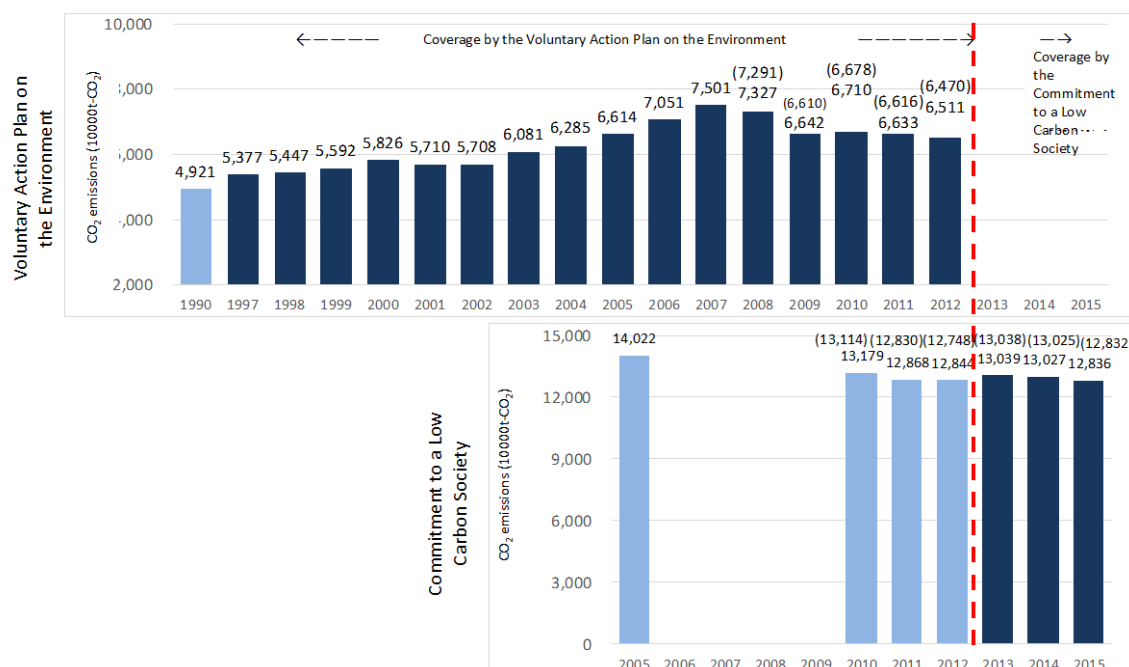
##### A. Performance

The Fiscal 2016 Follow-up revealed that in the transportation sector, industries participating in the Commitment to a Low Carbon Society followed a downward emission trend in fiscal 2015, emitting 128.36 million t-CO<sub>2</sub>, which was 1.5% (1.91 million t-CO<sub>2</sub>) below previous fiscal year levels, 1.6% (2.03 million t-CO<sub>2</sub>) below fiscal 2013 levels and 11.1% (11.86 million t-CO<sub>2</sub>) below fiscal 2005 levels (Figure 11).

Emissions from industries of the transportation sector participating in the Commitment

to a Low Carbon Society, excluding overseas emissions, collectively account for around 29.4% of total emissions from Japan's transportation sector as a whole (217.04 million t-CO<sub>2</sub> in fiscal 2014)<sup>10</sup>.

Figure 11. CO<sub>2</sub> emissions in the transportation sector



(Notes)

- The Voluntary Action Plan on the Environment was implemented through fiscal 2012 and succeeded by the Commitment to a Low Carbon Society from fiscal 2013.  
The figures for fiscal 2010-2012 under the Commitment to a Low Carbon Society have been calculated and provided as reference. (Figures for fiscal 2005 do not include data for the Association of Japanese Private Railways and the East Japan Railway Company.) The large differences in emissions under the Voluntary Action Plan on the Environment and the Commitment to a Low Carbon Society for fiscal 2010-2012 are attributable to the increase in the number of companies reporting their emissions.
- Calculation methods have been renewed with the implementation of the Commitment to a Low Carbon Society. (Used generation-end coefficients instead of receiving end emission coefficients to; set revised industrial boundaries in some industries).
- CO<sub>2</sub> emissions reflecting the decrease resulting from using post-adjustment emission coefficients stipulated in the Act on the Promotion of Global Warming Countermeasures are provided in brackets.
- Overseas emissions are included for the Japanese Shipowners' Association and a part of the Scheduled Airlines Association of Japan

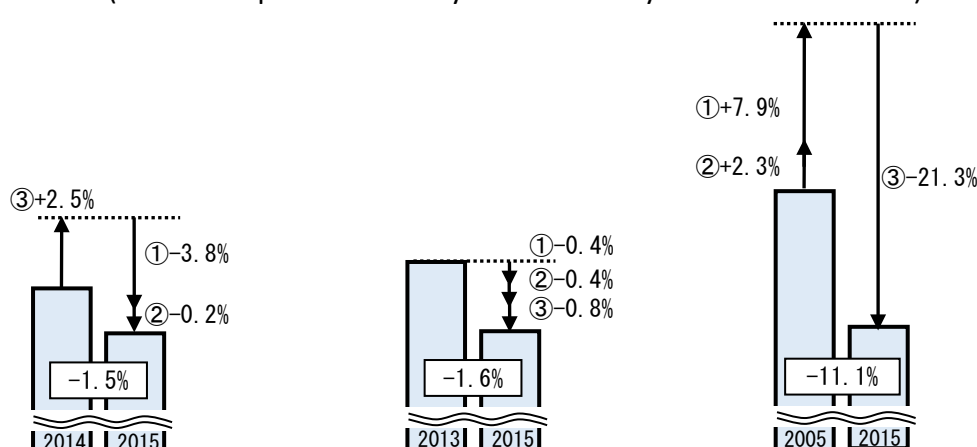
## B. Factor analysis

A factor analysis of the causes that led to CO<sub>2</sub> emission reductions in the transportation sector in fiscal 2015 (Figure 11) revealed that CO<sub>2</sub> emissions due to “③change in energy consumed per unit of economic activity” increased by 2.5% relative to the previous fiscal year. This was a result of decreased transportation efficiency amid shrinking overseas demand in some industries, as well as cheaper fuel prices. In contrast, compared with fiscal 2013 levels,

<sup>10</sup> CO<sub>2</sub> emissions for the “Transportation Sector” in “GHG Emissions Data of Japan” (final count for 1990-2014, National Institute for Environmental Studies). Includes data for passenger vehicles used in households.

emissions were reduced by 0.8%, and compared to fiscal 2005 levels, by 21.3%, thus exhibiting an overall downwards trend. Therefore, in the medium- to long-term, despite increased CO<sub>2</sub> emissions due to “①change in economic activity,” drastic reductions due to “③ change in energy consumed per unit of economic activity” have contributed to the overall reduction of CO<sub>2</sub> emissions. This is presumably the result of continued efforts to design, deploy, and improve cargo vehicles, ships, airplanes and railway cars with high levels of energy efficiency, as well as to engage in energy efficient operations and driving.

Figure 12. Factors of changes in emissions in the transportation sector  
(relative to previous fiscal year and fiscal years 2013 and 2005) \*<sup>1</sup>



	Relative to previous year (fiscal 2014)	Relative to fiscal 2013	Relative to fiscal 2005 * <sup>4</sup>
① Change in economic activity * <sup>2</sup>	-3.8% (-3.8%)	-0.4% (-0.4%)	+7.9% (+7.9%)
② Change in CO <sub>2</sub> emission factor * <sup>3</sup>	-0.2% (-0.2%)	-0.4% (-0.4%)	+2.3% (+2.3%)
③ Change in energy consumed per unit of economic activity	+2.5% (+2.5%)	-0.8% (-0.8%)	-21.3% (-21.3%)
Total	-1.5% (-1.5%)	-1.6% (-1.6%)	-11.1% (-11.1%)

\* 1 Due to the rounding of values to two decimal places, totals may differ from the sum of individual items.

CO<sub>2</sub> emissions reflecting the decrease resulting from using post-adjustment emission coefficients stipulated in the Act on the Promotion of Global Warming Countermeasures are provided in brackets.

\* 2 Indices with the closest relation to energy consumption were selected to represent each industry's economic activity.

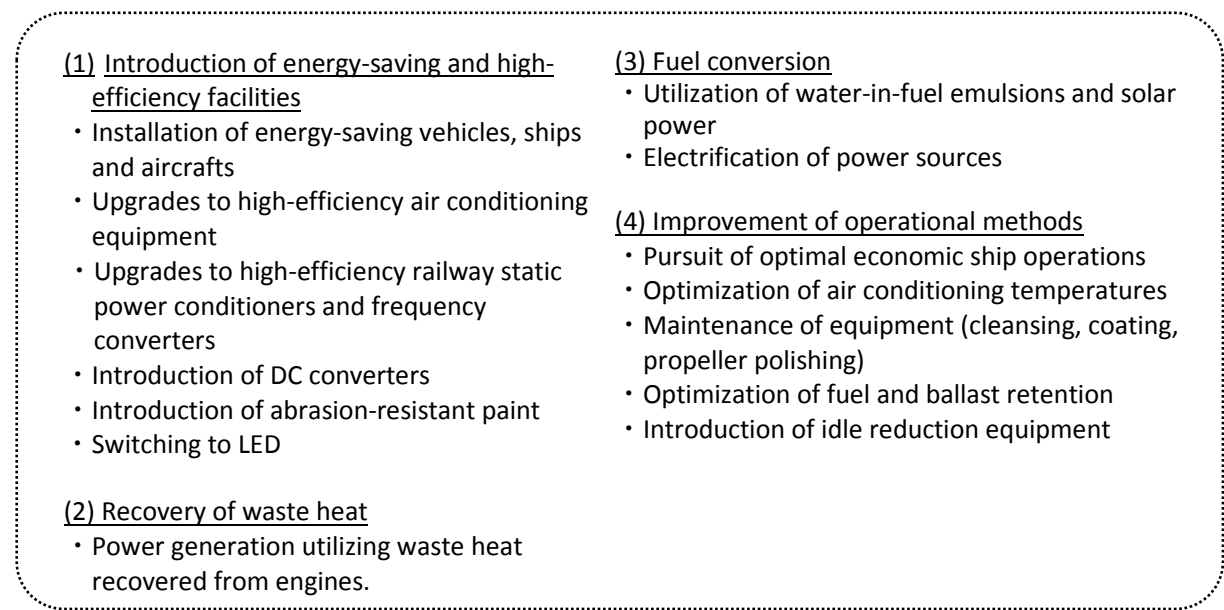
\* 3 CO<sub>2</sub> emissions per unit of heat output have been used for fuel, and CO<sub>2</sub> emissions per unit of power output, for electricity.

\* 4 Comparisons with fiscal 2005 performance were calculated excluding data for the Association of Japanese Private Railways and the East Japan Railway Company.

C. Efforts made in fiscal 2015

Industries continued to newly install or renew existing equipment (vehicles, ships, aircrafts, etc.) to high energy-saving performance models. Furthermore, fiscal 2015 saw accelerated progress in the utilization of water-in-fuel emulsions in ships (Figure 13).

Figure 13. Examples of efforts made in the transportation sector in fiscal 2015



D. Relevant logistics-related efforts made in non-transportation industries

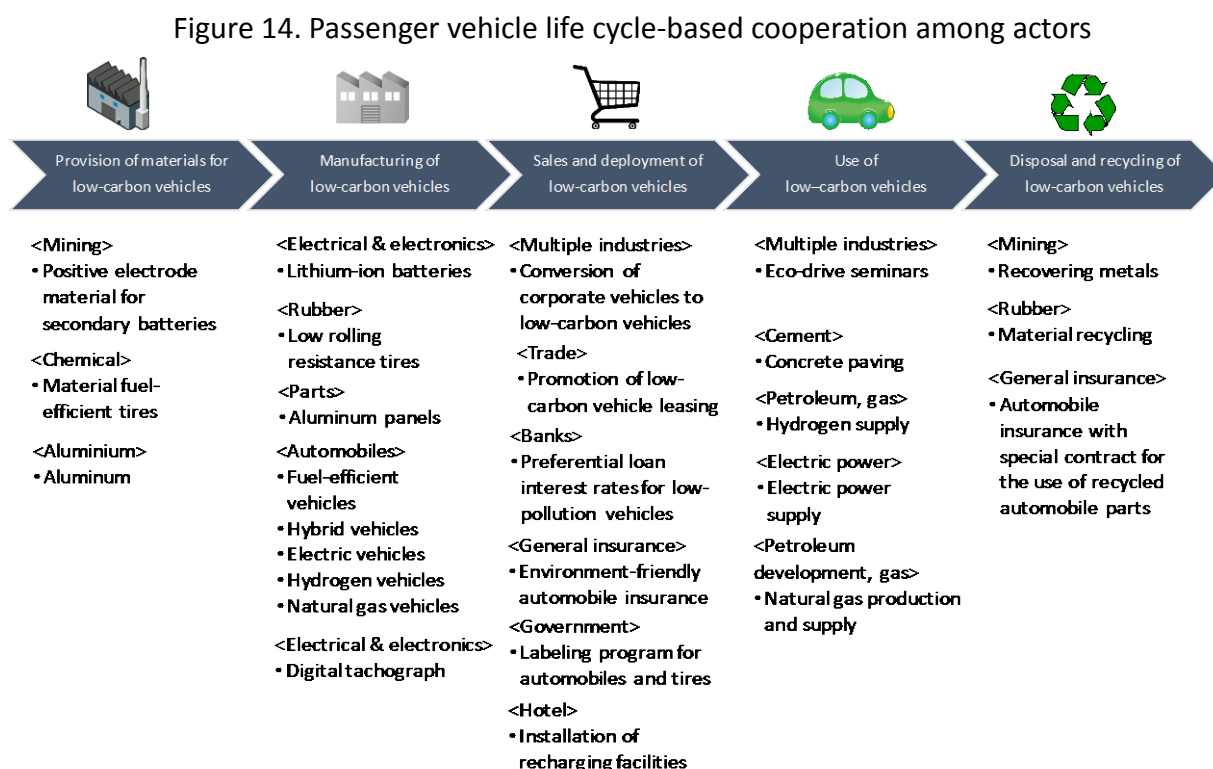
Energy efficiency improvement measures aimed at reducing emissions from the logistics sector are not limited to industries belonging to the transportation sector, but are also widely pursued in the industrial, energy conversion and commercial sectors. The sector is engaged in improving load factors and reducing empty trips by using consolidated services, developing distribution bases and promoting modal shifts. These efforts will be continued in the future.



## 2. Pillar 2: Strengthened co-operation with other interested groups

In order to achieve society-wide CO<sub>2</sub> emission reductions, it is important that CO<sub>2</sub> emissions are reduced not only from the manufacturing and production processes of each company but also from entire product lifecycles, including the use and consumption of energy-saving products and services. This requires not only the efforts of a single company or industry but collaboration with other various actors, such as customer companies, consumers, government, universities, etc. that are involved in the development, purchase and consumption of a product or service. Participating industries are particularly enthusiastic about developing and providing the world's leading energy-saving products and services as well as reaching out to users through public campaigns.

For example, in the transportation sector, industries have joined hands to achieve society-wide CO<sub>2</sub> emission reductions with a life cycle approach by providing low-carbon passenger vehicles that are fuel-efficient or run on electric power and fuel cells, supplying the material indispensable for such low-carbon technologies, and offering “eco-drive” lessons (Figure 14).



The commercial and household sectors also contribute to reducing CO<sub>2</sub> emissions through improvements in the energy saving performance of buildings by harnessing thermal insulation, etc., introducing energy management systems, providing high-efficiency energy-

saving and water-saving equipment, and adopting Cool Biz and Warm Biz dress codes (Figure 15).

Figure 15. Passenger vehicle life cycle-based cooperation among actors



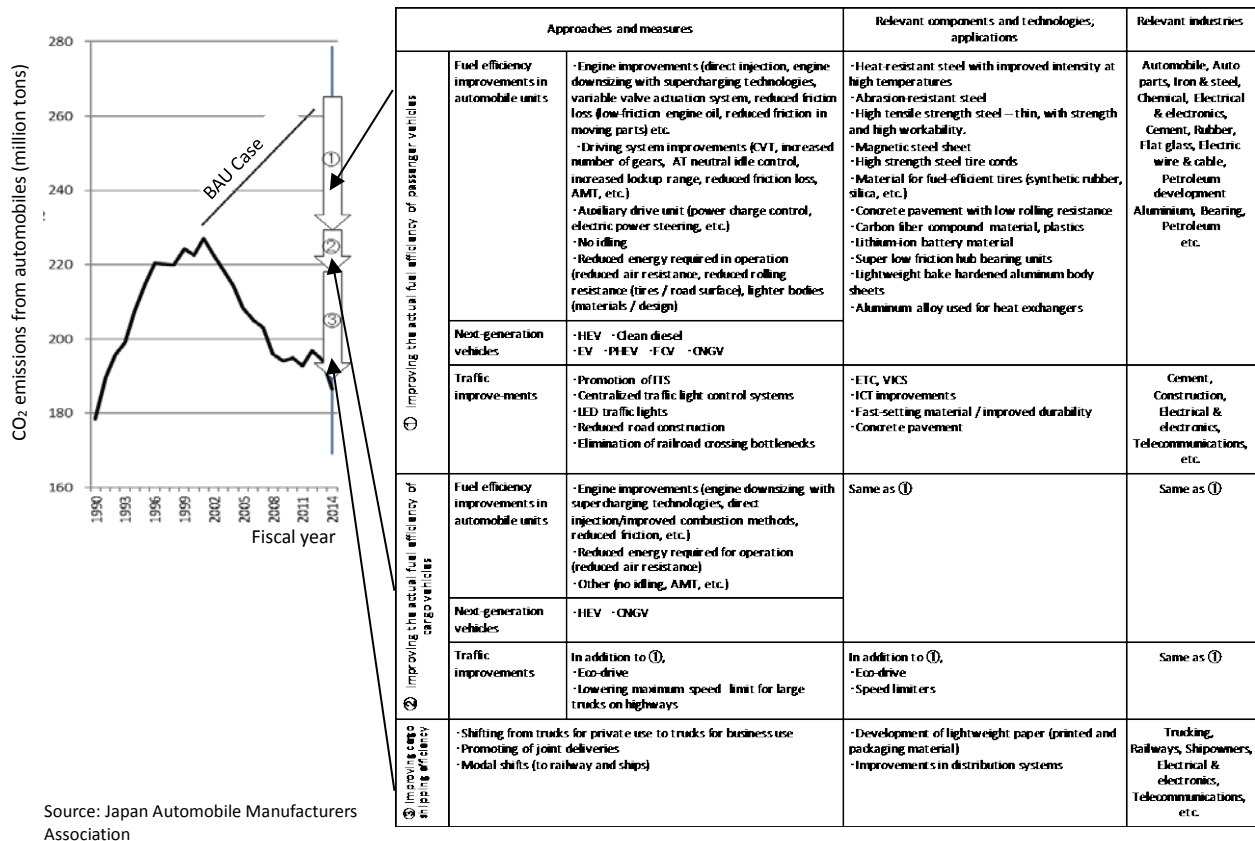
#### (1) Contribution through low-carbon products and services

Companies have contributed to reducing CO<sub>2</sub> emissions through their untiring efforts not only to reduce emissions from the manufacturing and production processes of their products but also by providing low-carbon products and services. Many industrial products, as is the case with automobiles and household appliances, emit more CO<sub>2</sub> when in use after they are purchased by consumers than during the manufacturing stage. Therefore, reduction potential is believed to be larger at end-use. Highly efficient products generally entail complex manufacturing processes and thus may increase CO<sub>2</sub> emissions at the manufacturing stage but in terms of the entire product life cycle, CO<sub>2</sub> emissions are substantially reduced.

For example, the reduction of CO<sub>2</sub> emissions from automobiles has contributed to emission reductions in the transportation sector by promoting the decarbonization of products and services with a business-oriented approach, through cross-sectoral collaboration in developing and deploying innovative technologies for materials and parts, equipment and production methods, practicing eco-driving, installing speed limiters and improving the

efficiency of cargo shipping (Figure 16).

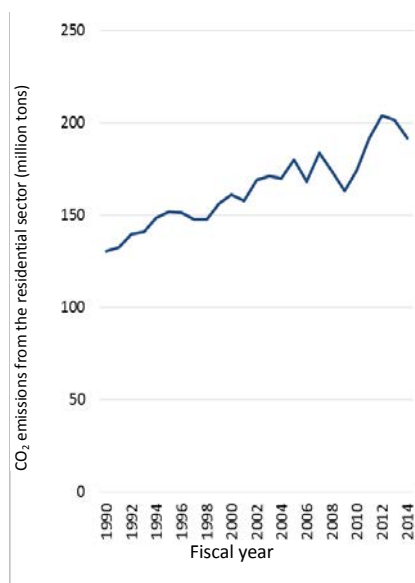
Figure 16. Examples of collaboration among relative industries and automobile-related CO<sub>2</sub> emissions in the transportation sector



Source: Japan Automobile Manufacturers Association

In the residential sector (Figure 17), the further deployment of LED lighting and energy-saving household appliances, as well as HEMS and other services promises to lead to increased emission reductions. Figure 18 presents examples of avoided CO<sub>2</sub> emissions in relevant industries.

Figure 17. CO<sub>2</sub> emission trends in the residential sector (reference)



Source: National Institute for Environmental Studies

Figure 18. Examples of avoided emissions attributable to low-carbon products in the residential sector

Examples of products	Avoided CO <sub>2</sub> emissions (estimates based on assumed duration of use)*1	Relevant industries
LED light bulbs	Approximately 4.33 million t-CO <sub>2</sub> avoided emissions compared to incandescent bulbs	Chemical, Electrical and electronics, Gas, Electricity, Glass, Housing
Household appliances and equipment (TVs, refrigerators, air conditioning equipment, lighting, fuel cells, high-efficiency water heaters)	Approximately 16.30 million t-CO <sub>2</sub> avoided compared to household appliances performance levels meeting Top Runner standards.	
Multi-glazed window glass	Approximately 240,000 t-CO <sub>2</sub> avoided emissions compared to single-glazed window glass.	

\* 1 Calculation methods and definitions are varied among products.

Many industries including those of the industrial sector have endeavored to provide a transparent and reliable quantitative account and report of CO<sub>2</sub> emissions avoided through low-carbon products and services by formulating guidelines for calculation and referring to officially announced standards.

The commercial sector also promotes efforts through financial services, including ESG investment and sales and purchase of green bonds.

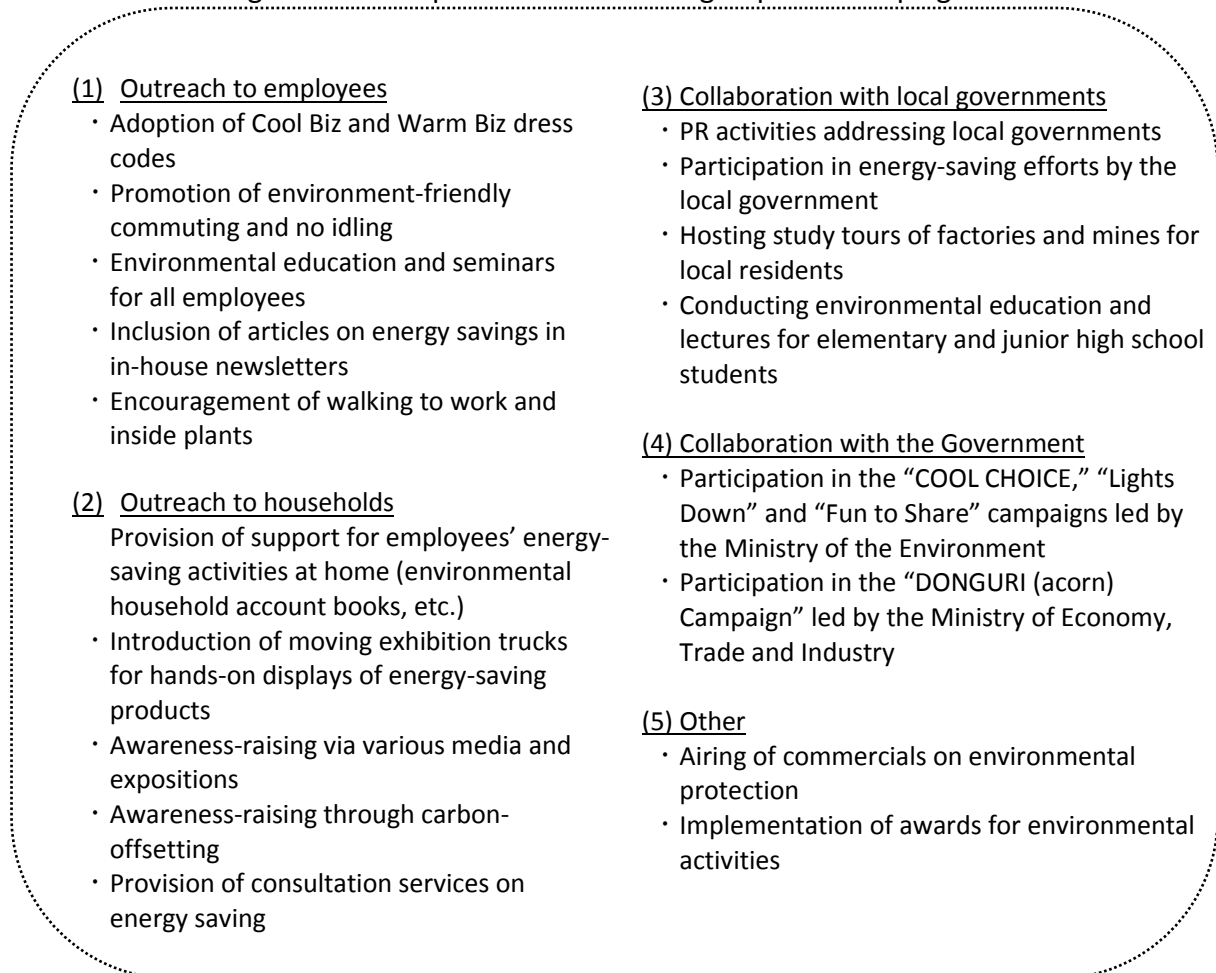
## (2) Efforts leading to public campaigns

In order for the abovementioned low-carbon products and services to contribute to reducing emissions, it is essential that products with high levels of efficiency and those that use low-carbon energy are not only developed but also wisely used by consumers. Therefore, society-wide CO<sub>2</sub> emission reductions involving the household sector (Figure 17) require public-private cooperation in promoting public campaigns so that each individual can reexamine his/her awareness, behavior and decisions and thus change his/her lifestyle.

The 2016 Follow-up results reveal that more than 80% of participating industries currently promote efforts that lead to public campaigns. The business community has engaged in a wide range of concerted efforts with unions, employees and their families, as well as local governments, administration, and educational institutes playing the roles of hubs, to provide services that would increase public awareness and knowledge about preventing global

warming, thus encouraging the use of energy-efficient low-carbon products and services and nature conservation, to perform public relations and educational activities, and to implement public campaigns (Figure 19).

Figure 19. Examples of efforts leading to public campaigns



### (3) Other

#### A. 3Rs and global warming countermeasures

The 3Rs (reduce, reuse, and recycle) pursued in order to create a recycle-based society can also contribute to countering global warming. In the Fiscal 2016 Follow-up, some industries reported that they had reduced the energy used for transportation by reducing waste volumes and developing lightweight thin-walled containers, and others reported that they had reduced CO<sub>2</sub> emissions by utilizing waste and byproducts.

In contrast, pursuing the 3Rs can sometimes lead to increased CO<sub>2</sub> emissions. For example, the cement industry receives waste and byproducts, including sewerage sludge, from other industries, and thus contributes to the nationwide reduction of waste volumes requiring final disposal. However, utilizing waste involves energy-consuming preliminary treatment, and

consequently increases CO<sub>2</sub> emissions. In the mining industry as well, CO<sub>2</sub> emissions are generally increased when recovering nonferrous metals by recycling instead of refining nonferrous ore. For example, in copper refining, the heat produced in the oxidization of the sulfur contained in copper ore can be utilized, but recycled materials contain little fuel component, and thus require more energy.

It should be noted that as such cases imply, focusing only on reducing CO<sub>2</sub> emissions and undermining the 3Rs may generate other problems, such as increasing the total volume of waste requiring final disposal across Japan.

## B. Fostering and conserving forest sinks

Global warming countermeasures also call for the fostering and conservation of forest sinks. According to the Fiscal 2016 Follow-up, more than 70% of participating industries are engaged in efforts leading to the fostering and conservation of forest sinks. Industries reported that in their conservation efforts, companies had harnessed the collective power of their many employees and organizational strengths to promote afforestation projects in Japan and overseas, engaged in the greening of factories and business locations, conducted management operations in company-owned forests, performed green procurement, and implemented projects for the utilization of biomass.

Figure 20. Examples of efforts leading to fostering and conserving forest sinks

### (1) Business-oriented conservation efforts

- Demonstration tests of coal-biomass co-combustion using unharnessed forest resources (forest residues)
- Provision of coffee produced at Rainforest Alliance certified plantations
- Sale of tree thinnings as lumber for construction and civil engineering.
- Replacement of wooden boxes used for shipping products from overseas factories with returnable steel pallets

### (2) Green procurement

- Procuring biomass-powered electricity
- Proactive use of paper made from tree thinnings or sourced from forests certified by FSC, PEFC or other forest certification program.

### (3) Greening and water source recharging efforts

- Participation in forest creation and water source recharging projects in collaboration with the national or local government
- Greening remaining walls of old mines
- Registration of corporate forests under the J-Credit scheme.
- Promotion of volunteer work, including conservation of green spaces, Satoyama conservation, and tropical forest restoration
- Provision of funds for forest management
- 

### (4) Biodiversity conservation

- Establishment of a botanical garden to preserve rare endangered plant species
- Proposal and implementation of methods to conserve biodiversity while also attempting to reduce CO<sub>2</sub> emissions at the planning and construction stages.

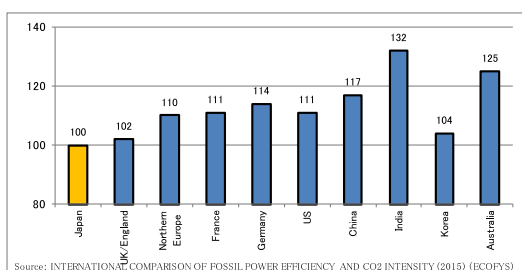
### 3. Pillar 3: Promoting contribution at the international level

#### (1) International comparison of energy efficiency

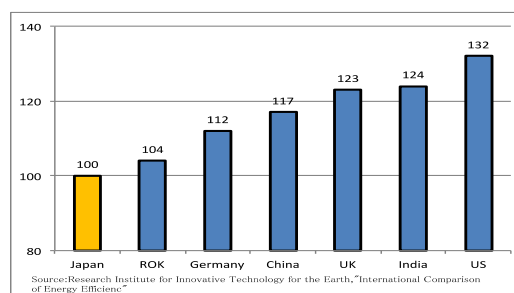
Under the Voluntary Action Plan on the Environment (Section on Global Warming Measures) and the Commitment to a Low Carbon Society, Japan's business community has endeavored to improve energy-saving technologies and energy efficiency. As a result, major industries have achieved world-leading energy efficiency levels, which continue to be maintained (Figure 21).

Figure 21. International comparison of energy efficiency

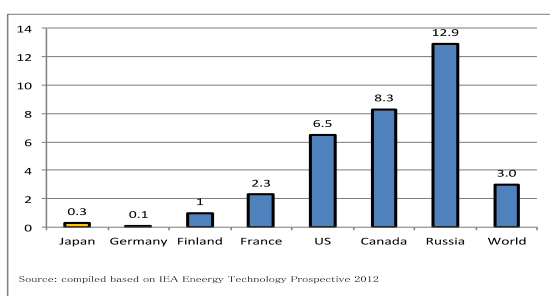
Energy required to generate 1kWh of electricity through thermal power generation (2014)



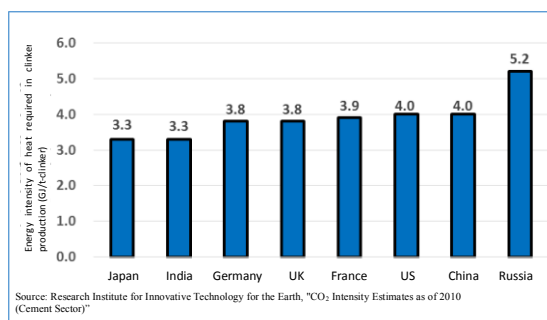
Energy required to produce 1 ton of iron (2010)



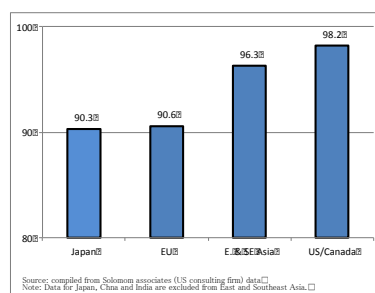
Energy-saving potential of adopting BAT in the pulp and paper industry (GJ/T)



Estimates of the energy intensity of heat required in clinker production (2010)



Comparison of energy consumption indices at oil refineries (2012)



## (2) International contribution through products, equipment and technology transfer

Having achieved the world's highest energy efficiency levels, Japan's business community has fostered advanced energy-saving and low-carbon technologies. It also possesses products and technologies with high energy-saving and energy efficiency performance.

However, Japan accounts for only 3.8% of the world's greenhouse gas emissions (2013) <sup>11</sup>. Therefore, it is essential that Japan contribute to the establishment of a world-leading low carbon society through the development and deployment of its highly energy-efficient and energy-saving low-carbon technologies and products.

In the Fiscal 2016 Follow-up, industries reported concrete examples of their international contributions to reduce CO<sub>2</sub> emissions (Table 2). In addition, many industries reported various efforts (relocating manufacturing processes overseas, exporting products, fostering human resources in developing countries, etc.) to deploy Japan's advanced energy-efficient low-carbon technologies and products overseas. Industries have also engaged in activities at international conferences (cooperating towards the formulation of international standards, introducing Japan's diverse global warming measures, etc.) and have contributed to the implementation of anti-pollution measures against air pollution and water contamination.

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<sup>11</sup> Source: Ministry of the Environment



Table 2. Estimated emissions avoided overseas in fiscal 2015 <sup>\*1</sup>

Products, facilities, technology transfers, etc.		Avoided emissions (estimates for fiscal 2015)		Industry
		Fiscal 2015 (one year)	Total years of operation	
Electric and electronic products	Power generation	10.38 Million t-CO <sub>2</sub>	402.62 Million t-CO <sub>2</sub>	Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention
	Household appliances	750,000 t-CO <sub>2</sub>	7.52 Million t-CO <sub>2</sub> (*3.09 Million t-CO <sub>2</sub> attributable to parts)	
	ICT products and solutions	8.70 Million t-CO <sub>2</sub>	43.49 Million t-CO <sub>2</sub> (*21.73 Million t-CO <sub>2</sub> attributable to parts)	
Major energy-saving equipment in iron manufacture	CDQ, TRT, byproduct gas-fired GTCC, OG gas recovery equipment, OG sensible heat recovery equipment, sintering plant waste heat recovery equipment	54.58 Million t-CO <sub>2</sub>	-	The Japan Iron and Steel Federation
Hydroelectric power generation	Huanllaca hydroelectric power plant (Peru)	14,000 t-CO <sub>2</sub> (30,000 MWh)	-	Japan Mining Industry Association
	Pallca hydroelectric power plant (Peru)	971 t-CO <sub>2</sub> (2,000 MWh)	-	
Wind power generation	Shepherds Flat (US)	1.48 Million t-CO <sub>2</sub>	-	Japan Foreign Trade Council, Inc.
	CPV Keenan II (US)	410,000 t-CO <sub>2</sub>	-	
Geothermal power generation	Sarulla Operations Ltd (Indonesia)	1 Million t-CO <sub>2</sub>	-	
Power generation using surplus steam from waste heat boilers at waste treatment plants (Thailand)		2,700 t-CO <sub>2</sub>	-	Japan Mining Industry Association
Waste incineration and power generation project (SITA UK) (UK)		340,000 t-CO <sub>2</sub>	-	Japan Foreign Trade Council, Inc.

\*1 Calculation methods and definitions are varied among products..

#### 4. Pillar 4: Development of innovative technologies

To promote measures in the above three pillars in the medium- to long-term, it is essential that participating industries develop innovative technologies. According to the results of the Fiscal 2016 Follow-up, industries have been engaged in efforts to develop innovative technologies and to work on practical application (Table 3). Future challenges include moving beyond technology development to wider horizons to develop and deploy innovative services and social systems.

Table 3. Examples of performance in fiscal 2015: from R&D to deployment

Phase	Description of technology	Industry
R&D	Developed evaluation technology for advanced functional materials, such as lithium-ion batteries, innovative battery technologies, organic EL, organic thin-film solar cells	Japan Chemical Industry Association
	Developed electrolytic copper recycling processes	Japan Mining Industry Association
	Developed filter coils for power stations for EVs and other environment-friendly vehicles, SMD coils for direct injection engine control units, and choke coils for DC-DC converters for idle-stopping	Japan Mining Industry Association
	Shortened and optimized reaction processes in order to reduce the amount of raw material, reagents, solvents and energy used	The Federation of Pharmaceutical Manufacturers' Associations of Japan
Demonstration	Completed construction of a 10m <sup>3</sup> trial blast furnace under the CO <sub>2</sub> Ultimate Reduction in Steelmaking Process by Innovative Technology for Cool Earth 50 (COURSE50), sponsored by NEDO. Performed two test runs and verification of specified features.	The Japan Iron and Steel Foundation
	Recovered unharnessed high-purity byproduct hydrogen and used it in fuel-cell vehicles and buses, and pure hydrogen fuel cell systems in the Shunan area.	Japan Chemical Industry Association
	Developed an inorganic separation membrane that will save energy by 50% in the distillation process. Pilot tests are currently being performed at actual plants.	Japan Chemical Industry Association
	Participated in the Floating Offshore Wind Turbine Demonstration Project and promoted efforts towards its commercialization.	Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention
	Succeeded in a transmitting electricity over a 500m superconducting transmission line in the Ishikari Superconducting DC Power Transmission System Project (=experimental study on high- temperature superconductive direct-current transmission system) and began superconducting DC power transmission from solar power station to a data center.	The Japanese Electric Wire & Cable Makers' Association
	Completed the reservoir evaluation study and long-term projection simulations for CO <sub>2</sub> injection under the CCS demonstration test. Finished injection well drilling and began CO <sub>2</sub> injection.	Japan Petroleum Development Association
	Advanced development of 3-5kW SOFC system for commercial use and launched field tests with prospective users	The Japan Gas Association
Practical application	Practical application of recycled aluminum in automobiles and railcars	The Japan Aluminum Association
	Manufactured deodorant functional sheets with metallic ions attached to the surface of cellulose nanofiber, transparent continuous CNF sheets and easily dispersible CNF wet powder	Japan Paper Association

## 5. Efforts made beyond the four pillars

In the Fiscal 2016 Follow-up, industries reported efforts made beyond the four pillars to reduce non-CO<sub>2</sub> GHG emissions and the status of their efforts under the Commitment to a Low Carbon Society Phase II. An outline of these efforts is provided below:

### (1) Reducing emissions of non-CO<sub>2</sub> greenhouse gases

To promote measures in the above three pillars in the medium- to long-term, it is essential that participating industries develop innovative technologies. According to the results of the Fiscal 2016 Follow-up, industries have been engaged in efforts to develop innovative technologies and to work on practical application.

### (2) Status of efforts under the Commitment to a Low Carbon Society Phase II

In April 2015, Keidanren formulated and announced the Commitment to a Low Carbon Society Phase II embracing targets for 2030 in order to further contribute to global warming countermeasures. At present, sixty industries and companies have set up targets for emissions from domestic business operations in 2030, in addition to existing targets for 2020, and will enhance their efforts in strengthened cooperation with other interested groups, promoting contribution at the international level and developing innovative technologies.

### (3) Status of the interim review of the Commitment to a Low Carbon Society

In January 2013, when Keidanren formulated Keidanren's Commitment to a Low Carbon Society, it decided to perform a review to check progress in fiscal 2016, which would mark the interim year of the program. From the perspective of ensuring the effectiveness of the Commitment to a Low Carbon Society, industries were asked whether they needed to update their assumptions and targets in light of not only their performance during fiscal years 2013-2015 but also the "Fiscal 2030 Energy Mix" and Intended Nationally Determined Contributions (INDC) adopted in fiscal 2015, as well as revisions made to business plans in response to recent economic trends<sup>12</sup>. As a result, six industries (Japan Iron and Steel Federation, Japan Automobile Manufacturers Association/Japan Auto-Body Industries Association, Japan Petroleum Development Association, Flour Millers Association, Japan Gas Association, Telecommunications Carriers Association) reviewed their initial targets and voluntarily renewed their targets for fiscal 2030.

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<sup>12</sup> <http://www.keidanren.or.jp/policy/2017/028.html> (available only in Japanese)

## Conclusion

The Paris Agreement which came into effect in November 2016 marked a milestone in history by committing all major emitters, including developed, emerging and developing economies, to take measures against global warming. It represents the international framework that Japan's business community has demanded for a long time.

In the future, Japan must balance "environment and economy" and make nationwide efforts to achieve the interim target of "26% below fiscal 2013 levels in fiscal 2030" that Japan pledged in its submission of Japan's Intended Nationally Determined Contribution (INDC) to the UN. In particular, the household sector, in which CO<sub>2</sub> emissions have increased 1.5 times during the past 25 years, must ensure the achievement of its target to reduce emissions by 40% through the utilization of low-carbon products and services that effectively contribute to reducing emissions and the promotion of successful public campaigns. Also, given its share of 3.8% of global CO<sub>2</sub> emissions, Japan should address emission reductions on a global scale by developing innovative low-carbon technologies and transferring and deploying them overseas to developing countries with large reduction potential. The business community is determined to soundly promote the Commitment to a Low Carbon Society, which is to serve as a basis for measures taken towards the achievement of mid-term goals and contribute to greenhouse gas emission reductions on a global scale, and at the same time ask the Government to support the efforts taken by the business community under this program.

In order for the Commitment to a Low Carbon Society to gain more trust among the general public and in society, it is indispensable to ensure its effectiveness, transparency and credibility. Therefore, in light of the results of the interim review, Keidanren will continue to join hands with participating industries and pursue the PDCA cycle to soundly implement the Commitment to a Low Carbon Society. This will involve evaluation by the Evaluation Committee and addressing the comments made by the Committee. We will also communicate in a comprehensive manner to both domestic and overseas audiences our contributions to global warming measures, including our efforts in strengthened cooperation with other interested groups, promoting contribution at the international level and developing innovative technologies.

## Industry-specific trends in each sector

## 1. Industrial Sector

10,000t-CO<sub>2</sub>: 10,000kl crude oil equivalent; fiscal year

Industry	(※1, ※2, ※3) (※: target adopted by the industry)	Notes	2005	2009	2010	2011	2012	2013	2014	2015	Relative to FY2005	Relative to FY2013	Relative to previous FY
The Japan Iron and Steel Federation	CO <sub>2</sub> emissions (actual emissions)	★	18,844	16,802	18,919	18,633	18,988	19,439	19,183	18,400	-2.4%	-5.3%	-4.1%
	CO <sub>2</sub> emissions (post-adjustment)		18,844	16,643	18,723	18,525	18,713	19,437	19,171	18,382	-2.5%	-5.4%	-4.1%
	CO <sub>2</sub> emission intensity index (actual emissions)		0.90	0.92	0.91	0.94	0.95	0.93	0.93	0.94	4.4%	1.5%	1.0%
	CO <sub>2</sub> emission intensity index (post-adjustment)		0.90	0.93	0.91	0.93	0.92	0.90	0.91	0.92	2.3%	2.1%	1.4%
	Energy consumption		5,902	5,261	5,933	5,776	5,813	5,920	5,841	5,619	-4.8%	-5.1%	-3.8%
	Energy consumption intensity index		0.90	0.92	0.91	0.92	0.92	0.90	0.90	0.91	1.8%	1.8%	1.3%
	Production activity index		1.03	0.90	1.03	0.98	0.99	1.04	1.02	0.97	-6.4%	-6.8%	-5.1%
Japan Chemical Industry Association	CO <sub>2</sub> emissions (actual emissions)	★	6,822	6,174	6,380	6,302	6,212	6,301	6,226	6,093	-10.7%	-3.3%	-2.1%
	CO <sub>2</sub> emissions (post-adjustment)		6,822	6,008	6,190	6,203	5,961	6,300	6,222	6,083	-10.8%	-3.4%	-2.2%
	CO <sub>2</sub> emission intensity index (actual emissions)	Base year: FY2005	100.00	100.01	100.13	104.03	106.62	103.66	104.43	100.58	0.6%	-3.0%	-3.7%
	CO <sub>2</sub> emission intensity index (post-adjustment)		100.00	97.31	97.16	102.40	102.33	103.65	104.36	100.41	0.4%	-3.1%	-3.8%
	Energy consumption		2,911	2,670	2,777	2,624	2,521	2,543	2,519	2,499	-14.1%	-1.7%	-0.8%
	Energy consumption intensity index	Base year: FY2005	100.00	101.35	102.13	101.51	101.39	98.05	99.02	96.68	-3.3%	-1.4%	-2.4%
	Production activity index		100	91	93	89	85	89	87	89	-11.2%	-0.3%	1.6%
Japan Paper Association	CO <sub>2</sub> emissions (actual emissions)	★	2,494	1,978	1,907	1,891	1,861	1,872	1,805	1,781	-28.6%	-4.9%	-1.3%
	CO <sub>2</sub> emissions (post-adjustment)		2,494	1,942	1,869	1,872	1,815	1,872	1,804	1,779	-28.7%	-5.0%	-1.4%
	CO <sub>2</sub> emission intensity index (actual emissions)		0.85	0.81	0.77	0.79	0.80	0.77	0.76	0.75	-15.2%	-2.8%	-0.8%
	CO <sub>2</sub> emission intensity index (post-adjustment)		0.88	0.80	0.75	0.78	0.78	0.77	0.76	0.75	-15.3%	-2.9%	-0.9%
	Energy consumption		890	706	687	658	630	629	608	598	-32.8%	-5.0%	-1.7%
	Energy consumption intensity index		0.84	0.77	0.74	0.73	0.72	0.69	0.68	0.67	-20.3%	-3.0%	-1.2%
	Production activity index		1.09	0.95	0.96	0.93	0.90	0.94	0.92	0.92	-15.8%	-2.1%	-0.5%
Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention ※4	CO <sub>2</sub> emissions (actual emissions)		1,804	1,665	1,653	1,805	1,343	1,294	1,333	1,348	-25.3%	4.2%	1.1%
	CO <sub>2</sub> emissions (post-adjustment)		1,804	1,467	1,451	1,704	1,169	1,293	1,330	1,340	-25.7%	3.6%	0.8%
	Energy consumption		1,010	980	974	890	597	569	599	623	-38.3%	9.4%	4.0%
	Energy consumption intensity index (reference value)						1.00	0.92	0.88	0.91		-1.8%	2.6%
	Energy consumption intensity target index	★					1.00	0.93	0.89	0.89		-4.3%	-0.4%
	Production activity index	Base year: FY2012					1.00	1.03	1.13	1.15		11.4%	1.5%
Japan Cement Association	CO <sub>2</sub> emissions (actual emissions)		2,188	1,756	1,662	1,712	1,769	1,806	1,775	1,720	-21.4%	-4.8%	-3.1%
	CO <sub>2</sub> emissions (post-adjustment)		2,188	1,744	1,650	1,704	1,749	1,806	1,774	1,719	-21.4%	-4.8%	-3.1%
	CO <sub>2</sub> emission intensity index (actual emissions)		1.00	1.01	1.00	1.00	1.00	0.98	0.98	0.98	-1.6%	0.3%	0.0%
	CO <sub>2</sub> emission intensity index (post-adjustment)		1.00	1.01	0.99	1.00	0.99	0.98	0.98	0.98	-1.7%	0.3%	0.0%
	Energy consumption		656	525	499	510	523	541	532	516	-21.4%	-4.6%	-3.1%
	Energy consumption intensity index	★	0.94	0.96	0.95	0.94	0.94	0.92	0.93	0.93	-1.7%	0.5%	0.0%
	Production activity index		0.79	0.63	0.60	0.62	0.64	0.67	0.65	0.63	-20.1%	-5.1%	-3.1%
Japan Automobile Manufacturers Association, Inc. / Japan Auto-Body Industries Association, Inc.	CO <sub>2</sub> emissions (actual emissions)	★	800	586	617	652	738	743	712	662	-17.2%	-10.9%	-7.0%
	CO <sub>2</sub> emissions (post-adjustment)		800	540	567	627	667	743	711	659	-17.6%	-11.2%	-7.2%
	CO <sub>2</sub> emission intensity index (actual emissions)		0.75	0.69	0.69	0.71	0.77	0.70	0.65	0.59	-21.5%	-15.5%	-9.5%
	CO <sub>2</sub> emission intensity index (post-adjustment)		0.75	0.64	0.63	0.69	0.70	0.70	0.65	0.59	-21.8%	-15.8%	-9.7%
	Energy consumption		395	317	332	313	332	331	322	306	-23.1%	-7.5%	-4.9%
	Energy consumption intensity index	Base year: FY2005	0.75	0.75	0.74	0.68	0.69	0.62	0.59	0.55	-27.0%	-12.2%	-7.5%
	Production activity index		1.07	0.86	0.91	0.92	0.97	1.07	1.10	1.13	5.4%	5.4%	2.7%
Japan Auto Parts Industries Association	CO <sub>2</sub> emissions (actual emissions)		743	547	600	680	757	768	743	687	-7.5%	-10.6%	-7.5%
	CO <sub>2</sub> emissions (post-adjustment)		743	496	542	648	671	768	741	684	-8.0%	-11.0%	-7.8%
	CO <sub>2</sub> emission intensity index (actual emissions)	★	0.79	0.59	0.60	0.66	0.71	0.70	0.69	0.66	-16.0%	-5.3%	-4.3%
	CO <sub>2</sub> emission intensity index (post-adjustment)		0.79	0.53	0.54	0.63	0.63	0.70	0.69	0.66	-16.4%	-5.8%	-4.6%
	Energy consumption		384	299	327	323	333	335	332	315	-18.0%	-6.1%	-5.4%
	Energy consumption intensity index		0.77	0.61	0.62	0.60	0.59	0.58	0.59	0.58	-25.5%	-0.6%	-2.1%
	Production activity index		1.24	1.22	1.32	1.35	1.40	1.44	1.41	1.36	10.0%	-5.5%	-3.3%
Japan Mining Industry Association	CO <sub>2</sub> emissions (actual emissions)		395	376	374	408	443	417	414	387	-2.1%	-7.1%	-6.5%
	CO <sub>2</sub> emissions (post-adjustment)		395	352	348	394	406	417	414	387	-2.1%	-7.1%	-6.5%
	CO <sub>2</sub> emission intensity index (actual emissions)	★	0.84	0.81	0.79	0.91	0.92	0.87	0.84	0.82	-3.1%	-6.4%	-2.9%
	CO <sub>2</sub> emission intensity index (post-adjustment)		0.84	0.76	0.74	0.88	0.84	0.87	0.84	0.82	-3.1%	-6.4%	-2.9%
	Energy consumption		161	161	161	159	162	163	163	154	-4.3%	-5.3%	-5.3%
	Energy consumption intensity index		0.83	0.84	0.83	0.86	0.81	0.82	0.80	0.79	-5.3%	-4.5%	-1.6%
	Production activity index		1.14	1.13	1.15	1.09	1.17	1.16	1.20	1.16	1.0%	-0.7%	-3.8%
Japan Federation of Construction Contractors	CO <sub>2</sub> emissions (actual emissions)		532	462	395	398	402	411	438	431	-18.9%	5.0%	-1.5%
	CO <sub>2</sub> emissions (post-adjustment)		532	449	382	390	387	411	438	431	-19.0%	4.8%	-1.6%
	CO <sub>2</sub> emission intensity index (actual emissions)	★	0.87	0.88	0.87	0.88	0.86	0.82	0.82	0.81	-6.4%	-0.4%	-1.0%
	CO <sub>2</sub> emission intensity index (post-adjustment)		0.87	0.85	0.84	0.86	0.83	0.82	0.82	0.81	-6.5%	-0.5%	-1.1%
	Energy consumption		229	193	169	162	157	159	170	168	-26.5%	6.2%	-0.6%
	Energy consumption intensity index		0.84	0.82	0.83	0.80	0.75	0.71	0.71	0.71	-15.1%	0.8%	-0.1%
	Production activity index		0.64	0.55	0.48	0.48	0.49	0.53	0.56	0.56	-13.4%	5.4%	-0.5%
Japan Federation of Housing Organizations	CO <sub>2</sub> emissions (actual emissions)		326	235	240	245	262	260	236	235	-27.9%	-9.6%	-0.4%
	CO <sub>2</sub> emissions (post-adjustment)		326	235	240	245	262	260	236	235	-27.9%	-9.6%	-0.4%
	CO <sub>2</sub> emission intensity index (actual emissions)		0.84	0.96	0.90	0.89	0.91	0.82	0.88	0.86	1.7%	4.4%	-2.5%
	CO <sub>2</sub> emission intensity index (post-adjustment)		0.84	0.96	0.90	0.89	0.91	0.82	0.88	0.86	1.7%	4.4%	-2.5%
	Energy consumption		125	90	92	94	101	100	91	90	-27.8%	-9.6%	-0.2%
	Energy consumption intensity index		0.86	0.97	0.91	0.91	0.93	0.84	0.89	0.87	1.8%	4.4%	-2.3%
	Production activity index		0.79	0.50	0.55	0.56	0.59	0.65	0.55	0.56	-29.1%	-13.4%	2.1%

Industry	(*1, *2, *3) (☆: target adopted by the industry)	Notes	2005	2009	2010	2011	2012	2013	2014	2015	Relative to FY2005	Relative to FY2013	Relative to previous FY	
Lime Manufacture Association	CO2 emissions (actual emissions)	☆	308	244	268	234	227	246	246	223	-27.6%	-9.6%	-9.5%	
	CO2 emissions (post-adjustment)		308	241	265	232	223	246	246	223	-27.7%	-9.6%	-9.5%	
	CO2 emission intensity index (actual emissions)		0.86	0.78	0.76	0.74	0.76	0.78	0.78	0.76	-12.4%	-2.8%	-2.5%	
	CO2 emission intensity index (post-adjustment)		0.86	0.77	0.75	0.74	0.74	0.78	0.78	0.76	-12.5%	-2.9%	-2.6%	
	Energy consumption		106	87	96	83	79	84	84	76	-28.2%	-10.1%	-9.9%	
	Energy consumption intensity index		0.86	0.81	0.79	0.76	0.77	0.77	0.77	0.75	-13.1%	-3.3%	-3.0%	
	Production activity index		1.00	0.88	0.99	0.88	0.84	0.89	0.89	0.83	-17.4%	-7.0%	-7.1%	
The Japan Rubber Manufacturers Association*1	CO2 emissions (actual emissions)		213	169	180	181	169	168	167	160	-24.8%	-4.8%	-3.9%	
	CO2 emissions (post-adjustment)		213	149	159	196	185	209	202	189	-11.1%	-9.6%	-6.6%	
	CO2 emission intensity index (actual emissions)	☆	1.00	0.99	0.92	0.91	0.92	0.90	0.91	0.93	-6.7%	3.6%	2.7%	
	CO2 emission intensity index (post-adjustment)		1.00	0.87	0.81	0.99	1.01	1.12	1.10	1.10	10.2%	-1.6%	-0.2%	
	Energy consumption		113	98	105	105	99	98	96	93	-17.4%	-5.1%	-3.5%	
	Energy consumption intensity index		1.00	1.09	1.01	1.00	1.02	0.99	0.99	1.02	2.4%	3.2%	3.1%	
	Production activity index		1.00	0.80	0.92	0.93	0.86	0.88	0.86	0.81	-19.3%	-8.1%	-6.4%	
The Federation of Pharmaceutical Manufacturers' Associations of Japan	CO2 emissions (actual emissions)	☆	242	208	209	232	255	254	244	238	-1.6%	-6.2%	-2.3%	
	CO2 emissions (post-adjustment)		242	193	193	223	232	254	243	237	-2.0%	-6.5%	-2.6%	
	CO2 emission intensity index (actual emissions)		0.90	0.70	0.68	0.72	0.77	0.74	0.73	0.71	-20.5%	-3.5%	-2.5%	
	CO2 emission intensity index (post-adjustment)		0.90	0.65	0.63	0.69	0.70	0.74	0.73	0.71	-20.8%	-3.9%	-2.7%	
	Energy consumption		117	110	111	110	114	113	110	110	-5.9%	-2.6%	-0.1%	
	Energy consumption intensity index		0.91	0.78	0.76	0.72	0.73	0.69	0.70	0.69	-23.9%	0.2%	-0.2%	
	Production activity index		1.65	1.82	1.87	1.97	2.01	2.10	2.04	2.04	23.8%	-2.8%	0.1%	
Japan Aluminium Association	CO2 emissions (actual emissions)		168.0	132.4	138.5	144.9	147.9	145.3	148.3	143.8	-14%	-1.1%	-3.1%	
	CO2 emissions (post-adjustment)		168.0	123.9	129.3	140.2	135.8	145.3	148.1	143.3	-14.7%	-1.4%	-3.3%	
	CO2 emission intensity index (actual emissions)		0.97	0.88	0.85	0.95	1.01	1.01	0.95	0.93	-3.7%	-7.6%	-2.0%	
	CO2 emission intensity index (post-adjustment)		0.97	0.83	0.79	0.92	0.93	1.01	0.95	0.93	-4.0%	-7.9%	-2.2%	
	Energy consumption		80.72	69.47	72.69	69.00	66.90	65.26	67.43	66.68	-17.4%	2.2%	-1.1%	
	Energy consumption intensity index	☆	0.94	0.93	0.90	0.91	0.92	0.91	0.87	0.87	-7.1%	-4.6%	0.0%	
	Production activity index		1.12	0.96	1.05	0.98	0.94	0.93	1.01	0.99	-11.1%	7.1%	-1.1%	
Japan Federation of Printing Industries *5	CO2 emissions (actual emissions)	☆	133	125	126	144	147	145	138	129	-2.9%	-10.5%	-6.5%	
	CO2 emissions (post-adjustment)		133	113	114	137	131	144	138	129	-3.4%	-11.0%	-6.8%	
	Energy consumption		72	70	71	70	66	64	63	60	-16.9%	-6.5%	-4.2%	
Flat Glass Manufacturers Association of Japan	CO2 emissions (actual emissions)	☆	134	110	115	117	113	117	110	106	-20.9%	-9.2%	-3.5%	
	CO2 emissions (post-adjustment)		134	107	113	115	109	117	110	106	-21.0%	-9.3%	-3.6%	
	CO2 emission intensity index (actual emissions)		1.03	1.15	1.03	1.10	1.00	0.93	0.94	0.88	-14.7%	-6.1%	-6.3%	
	CO2 emission intensity index (post-adjustment)		1.03	1.12	1.01	1.08	0.96	0.93	0.94	0.88	-14.8%	-6.2%	-6.4%	
	Energy consumption		52	44	46	45	43	44	42	41	-21.1%	-6.1%	-1.0%	
	Energy consumption intensity index		1.00	1.14	1.03	1.06	0.95	0.87	0.88	0.85	-14.8%	-3.0%	-3.9%	
	Production activity index		0.72	0.53	0.62	0.59	0.63	0.69	0.65	0.67	-7.3%	-3.2%	3.0%	
Japan Soft Drink Association	CO2 emissions (actual emissions)		102	103	104	110	117	121	115	114	11.9%	-5.3%	-0.4%	
	CO2 emissions (post-adjustment)		102	103	99	107	109	121	115	114	11.5%	-5.6%	-0.5%	
	CO2 emission intensity index (actual emissions)	☆	1.13	1.03	0.98	1.00	1.03	0.98	0.94	0.90	-20.3%	-8.4%	-4.2%	
	CO2 emission intensity index (post-adjustment)		1.13	1.03	0.93	0.97	0.97	0.98	0.94	0.90	-20.5%	-8.6%	-4.3%	
	Energy consumption		48	53	54	53	54	56	54	55	13.1%	-2.5%	1.9%	
	Energy consumption intensity index		1.20	1.19	1.13	1.08	1.08	1.02	0.99	0.97	-19.4%	-5.6%	-2.0%	
	Production activity index		1.92	2.11	2.25	2.34	2.39	2.60	2.59	2.69	40.3%	3.3%	4.0%	
Japan Dairy Industry Association	CO2 emissions (actual emissions)		112	110	110	115	121	119	115	116	3.3%	-2.8%	0.6%	
	CO2 emissions (post-adjustment)		112	105	104	112	113	119	115	115	3.0%	-3.0%	0.5%	
	CO2 emission intensity index (actual emissions)		1.19	1.23	1.22	1.24	1.27	1.25	1.20	1.17	-2.2%	-6.8%	-3.0%	
	CO2 emission intensity index (post-adjustment)		1.19	1.17	1.16	1.21	1.19	1.25	1.20	1.16	-2.5%	-7.0%	-3.1%	
	Energy consumption		51	54	54	52	53	52	51	52	1.2%	1.0%	2.7%	
	Energy consumption intensity index	☆	1.16	1.26	1.26	1.19	1.17	1.14	1.12	1.11	-4.2%	-3.2%	-0.9%	
	Production activity index		1.09	1.04	1.05	1.08	1.11	1.11	1.11	1.15	5.6%	4.3%	3.7%	
The Japanese Electric Wire & Cable Makers' Association (metal (copper/aluminum) cable) (metal (copper/aluminum) cable) (optical fiber cable) (optical fiber cable) (metal (copper/aluminum) cable) (optical fiber cable) (metal (copper/aluminum) cable) (optical fiber cable)	CO2 emissions (actual emissions)		91	78	82	94	99	96	91	88	-3.1%	-7.9%	-3.3%	
	CO2 emissions (post-adjustment)		91	69	72	89	86	96	91	88	-3.7%	-8.4%	-3.6%	
	CO2 emission intensity index (actual emissions)		1.06	1.09	1.15	1.28	1.36	1.29	1.22	1.21	14.2%	-6.4%	-1.1%	
	CO2 emission intensity index (post-adjustment)		1.06	0.96	1.01	1.21	1.19	1.29	1.22	1.20	13.5%	-6.9%	-1.4%	
	CO2 emission intensity index (actual emissions)		0.27	0.22	0.24	0.26	0.26	0.28	0.24	0.22	-16.7%	-19.9%	-9.0%	
	CO2 emission intensity index (post-adjustment)		0.27	0.19	0.21	0.25	0.22	0.28	0.24	0.22	-17.2%	-20.4%	-9.4%	
	Energy consumption	☆	50.3	44.8	46.8	45.3	43.4	41.7	40.6	40.4	-19.6%	-3.0%	-0.3%	
	Energy consumption intensity index		1.00	1.06	1.12	1.06	1.03	0.96	0.93	0.95	-4.9%	-1.5%	1.9%	
	Energy consumption intensity index		0.24	0.20	0.22	0.20	0.18	0.19	0.17	0.16	-33.6%	-15.1%	-5.9%	
	Production activity index		0.73	0.57	0.57	0.58	0.57	0.59	0.60	0.58	-20.8%	-1.7%	-3.1%	
	Production activity index		14.4	23.6	22.0	25.0	27.2	23.8	24.6	27.5	91.7%	15.8%	11.8%	
	The Japan Bearing Industrial Association	CO2 emissions (actual emissions)		73	58	70	83	84	85	84	79	7.9%	-6.5%	-5.4%
		CO2 emissions (post-adjustment)		73	51	62	79	73	85	83	79	7.3%	-7.0%	-5.7%
CO2 emission intensity index (actual emissions)			0.98	0.97	0.90	1.03	1.14	1.13	1.04	1.03	5.4%	-8.5%	-1.0%	
CO2 emission intensity index (post-adjustment)			0.98	0.86	0.79	0.98	0.99	1.13	1.04	1.03	4.8%	-9.0%	-1.4%	
CO2 emission intensity index (fixity coefficient)		☆	0.87	0.87	0.80	0.78	0.79	0.79	0.74	0.76	-13.5%	-3.9%	2.0%	
Energy consumption			40	33	40	40	37	37	37	36	-9.5%	-1.6%	-2.6%	
Energy consumption intensity index			0.86	0.88	0.81	0.79	0.80	0.79	0.74	0.76	-11.6%	-3.8%	1.9%	
Production activity index		1.32	1.06	1.39	1.42	1.29	1.32	1.41	1.35	2.4%	2.2%	-4.4%		

Industry	(*1, *2, *3) (☆: target adopted by the industry)	Notes	2005	2009	2010	2011	2012	2013	2014	2015	Relative to FY2005	Relative to FY2013	Relative to previous FY
The Japan Society of Industrial Machinery	CO2 emissions (actual emissions)		64	52	56	63	66	66	67	63	-1.3%	-5.1%	-6.5%
	CO2 emissions (post-adjustment)		64	47	50	60	58	66	67	62	-1.8%	-5.5%	-6.8%
	Energy consumption		34	29	31	30	29	29	30	29	-14.8%	-0.4%	-3.8%
	Production activity index		1.00	1.03	1.00	1.06	1.02	1.00	1.10	1.16	15.8%	15.2%	5.0%
Japan Petroleum Development Association	CO2 emissions (actual emissions)	☆	22	27	25	23	25	25	22	22	-3.2%	-15.2%	-2.6%
	CO2 emissions (post-adjustment)		22	27	24	23	24	25	22	22	-3.3%	-15.3%	-2.7%
	CO2 emission intensity index (actual emissions)	☆	0.79	0.85	0.83	0.78	0.90	0.99	0.93	0.93	17.7%	-6.5%	-0.7%
	CO2 emission intensity index (post-adjustment)		0.79	0.83	0.81	0.77	0.87	0.99	0.93	0.93	17.5%	-6.7%	-0.8%
	Energy consumption		9	10	10	10	10	11	9	9	9.4%	-12.2%	1.9%
	Energy consumption intensity index		0.80	0.80	0.85	0.89	0.97	1.09	1.02	1.06	32.9%	-3.2%	3.9%
	Production activity index		1.75	2.00	1.85	1.84	1.73	1.59	1.47	1.44	-17.7%	-9.3%	-1.9%
Japan Copper and Brass Association	CO2 emissions (actual emissions)		42	39	42	44	47	47	46	42	-0.4%	-10.9%	-7.2%
	CO2 emissions (post-adjustment)		42	35	37	42	42	48	46	43	2.2%	-8.9%	-4.9%
	CO2 emission intensity index (actual emissions)		1.00	1.10	1.06	1.21	1.35	1.28	1.20	1.24	23.7%	-3.4%	2.7%
	CO2 emission intensity index (post-adjustment)		1.00	0.99	0.95	1.15	1.21	1.28	1.21	1.27	26.9%	-1.1%	5.2%
	Energy consumption		23	22	23	22	21	21	21	20	-14.9%	-7.1%	-4.9%
	Energy consumption intensity index		1.00	1.13	1.09	1.08	1.11	1.05	1.01	1.06	5.8%	0.8%	5.2%
	Production activity index		1.00	0.83	0.93	0.87	0.82	0.87	0.89	0.80	-19.5%	-7.8%	-9.6%
Brewers Association of Japan	CO2 emissions (actual emissions)		90	60	57	53	52	49	48	47	-47.5%	-3.7%	-1.7%
	CO2 emissions (post-adjustment)		90	58	54	55	54	55	53	51	-43.2%	-6.1%	-2.8%
	CO2 emission intensity index (actual emissions)		0.79	0.56	0.54	0.51	0.50	0.49	0.48	0.47	-40.7%	-3.2%	-2.0%
	CO2 emission intensity index (post-adjustment)		0.79	0.54	0.52	0.54	0.53	0.54	0.52	0.51	-35.9%	-5.7%	-3.2%
	Energy consumption		43	32	30	28	28	26	25	25	-42.2%	-4.5%	-1.6%
	Energy consumption intensity index	☆	0.79	0.62	0.60	0.57	0.56	0.54	0.53	0.52	-34.8%	-4.0%	-2.0%
	Production activity index		0.98	0.92	0.90	0.88	0.88	0.87	0.86	0.86	-11.3%	-0.5%	0.4%
The Shipbuilders' Association of Japan and the Cooperative As: Shi	CO2 emissions (actual emissions)						68	65	70	69		6.6%	-0.2%
	CO2 emissions (post-adjustment)						59	65	69	69		6.1%	-0.5%
	CO2 emission intensity index (actual emissions)	☆					1.00	1.06	1.12	1.00		-4.8%	-10.1%
	CO2 emission intensity index (post-adjustment)						1.00	1.21	1.28	1.15		-5.3%	-10.4%
	CO2 emission intensity index (actual emissions)	☆					1.00	1.17	1.27	1.26		8.1%	-0.9%
	CO2 emission intensity index (post-adjustment)						1.00	1.34	1.45	1.44		7.5%	-1.3%
	Energy consumption						29.0	27.6	30.0	30.8		11.7%	2.7%
	Energy consumption intensity index						29.04	27.61	30.05	30.85		11.7%	2.7%
	Energy consumption intensity index						1.00	0.95	1.00	1.03		8.0%	2.7%
	Production activity index						1.00	0.91	0.92	1.02		12.0%	11.1%
Limestone Association of Japan	CO2 emissions (actual emissions)	☆	22	18	19	19	20	21	21	21	-4.9%	0.3%	-0.4%
	CO2 emissions (post-adjustment)		22	19	19	23	24	28	28	27	22.2%	-4.1%	-2.7%
	CO2 emission intensity index (actual emissions)		0.98	1.00	1.00	1.00	1.00	1.00	1.02	1.04	6.4%	4.0%	2.2%
	CO2 emission intensity index (post-adjustment)		0.95	1.00	1.00	1.17	1.18	1.31	1.30	1.30	36.9%	-0.6%	-0.1%
	Energy consumption		12	10	11	11	11	12	12	12	-5.5%	-0.4%	-0.4%
	Energy consumption intensity index		0.96	0.99	1.00	0.99	0.99	0.98	0.99	1.01	5.8%	3.2%	2.2%
	Production activity index		1.00	0.81	0.83	0.85	0.89	0.93	0.92	0.89	-10.7%	-3.5%	-2.6%
Japan Machine Tool Builders Association	CO2 emissions (actual emissions)		27	20	26	32	35	36	37	36	31.4%	-2.0%	-4.1%
	CO2 emissions (post-adjustment)		27	17	23	30	31	36	37	35	30.6%	-2.6%	-4.4%
	CO2 emission intensity index (actual emissions)		0.84	1.41	1.09	1.15	1.23	1.31	1.13	1.04	24.5%	-20.7%	-7.9%
	CO2 emission intensity index (post-adjustment)		0.84	1.24	0.96	1.08	1.07	1.31	1.13	1.04	23.8%	-21.1%	-8.2%
	Energy consumption		15	11	15	15	15	15	16	16	9.0%	3.5%	-1.1%
	Energy consumption intensity index	☆	0.78	1.36	1.05	0.94	0.91	0.96	0.85	0.80	3.3%	-16.2%	-4.9%
	Production activity index		1.29	0.56	0.95	1.10	1.14	1.10	1.31	1.36	5.5%	23.5%	4.1%
Japan Sanitary Industry Equipment Association	CO2 emissions (actual emissions)	☆	36	26	24	28	26	26	23	20	-45.3%	-22.0%	-13.5%
	CO2 emissions (post-adjustment)		36	24	22	27	24	26	23	20	-45.5%	-22.3%	-13.8%
	CO2 emission intensity index (actual emissions)		0.69	0.57	0.45	0.52	0.48	0.42	0.39	0.34	-50.3%	-19.2%	-12.0%
	CO2 emission intensity index (post-adjustment)		0.69	0.54	0.42	0.50	0.44	0.42	0.39	0.34	-50.5%	-19.5%	-12.2%
	Energy consumption		17	13	13	13	12	12	11	9	-45.9%	-19.3%	-12.2%
	Energy consumption intensity index		0.69	0.62	0.50	0.52	0.46	0.41	0.38	0.34	-50.8%	-16.4%	-10.6%
	Production activity index		1.07	0.92	1.07	1.08	1.10	1.22	1.20	1.18	10.1%	-3.5%	-1.8%
Flour Millers Association	CO2 emissions (actual emissions)		23	22	23	28	31	31	30	29	22.6%	-5.9%	-5.3%
	CO2 emissions (post-adjustment)		23	19	20	26	26	30	30	29	21.8%	-6.4%	-5.6%
	CO2 emission intensity index (actual emissions)	☆	1.06	1.03	1.03	1.27	1.40	1.39	1.38	1.29	21.6%	-6.7%	-6.2%
	CO2 emission intensity index (post-adjustment)		1.06	0.89	0.89	1.19	1.19	1.38	1.37	1.28	20.8%	-7.3%	-6.6%
	Energy consumption		13	13	14	14	13	13	13	13	-3.3%	-1.3%	2.5%
	Energy consumption intensity index		0.97	0.97	0.97	0.98	0.97	0.95	0.96	0.93	-4.1%	-2.1%	-3.4%
	Production activity index		1.17	1.14	1.18	1.18	1.16	1.17	1.16	1.18	0.9%	0.9%	1.0%
Japan Industrial Vehicles Association	CO2 emissions (actual emissions)	☆	7.0	4.4	4.9	5.9	5.6	4.7	4.7	4.5	-36.1%	-5.2%	-5.0%
	CO2 emissions (post-adjustment)		7.0	4.1	4.5	5.6	5.0	4.7	4.7	4.4	-36.4%	-5.6%	-5.3%
	CO2 emission intensity index (actual emissions)		1.18	1.39	1.13	1.22	1.23	1.05	1.01	0.96	-18.6%	-8.6%	-4.6%
	CO2 emission intensity index (post-adjustment)		1.18	1.29	1.04	1.17	1.10	1.05	1.00	0.95	-19.0%	-9.0%	-4.9%
	Energy consumption		3.6	2.4	2.7	2.8	2.5	2.1	2.1	2.1	-43.4%	-1.3%	-2.5%
	Energy consumption intensity index		1.16	1.42	1.17	1.11	1.04	0.88	0.86	0.84	-28.0%	-4.8%	-2.1%
	Production activity index		0.90	0.48	0.66	0.73	0.69	0.68	0.71	0.71	-21.4%	3.7%	-0.4%

Industry	(*1, *2, *3) (☆: target adopted by the industry)	Notes										2015	Relative to FY2005	Relative to FY2013	Relative to previous FY
			2005	2009	2010	2011	2012	2013	2014						
Japan Association of Rolling Stock Industries	CO2 emissions (actual emissions)	☆	3.7	3.5	3.5	3.6	3.6	3.6	3.6	3.4	-7.1%	-5.7%	-5.2%		
	CO2 emissions (post-adjustment)		3.7	3.2	3.1	3.5	3.2	3.6	3.6	3.4	-7.6%	-6.2%	-5.5%		
	CO2 emission intensity index (actual emissions)		0.55	0.43	0.48	0.55	0.61	0.50	0.51	0.44	-21.3%	-13.2%	-14.5%		
	CO2 emission intensity index (post-adjustment)		0.55	0.38	0.42	0.52	0.54	0.50	0.51	0.43	-21.8%	-13.7%	-14.8%		
	Energy consumption		2.0	2.0	2.0	1.7	1.6	1.6	1.6	1.6	-22.2%	-1.2%	-2.6%		
	Energy consumption intensity index		0.55	0.43	0.49	0.47	0.49	0.40	0.41	0.36	-34.1%	-9.1%	-12.2%		
	Production activity index		1.43	1.80	1.59	1.44	1.27	1.56	1.53	1.69	18.1%	8.6%	10.9%		
Emissions from industrial processes *5	CO2 emissions		5,073	4,088	4,183	4,145	4,169	4,361	4,327	4,141	-18.4%	-4.3%	-4.3%		
Revisions *1	CO2 emissions (actual emissions)		23	24	25	43	53	53	48	43					
	CO2 emissions (post-adjustment)		23	33	34	21	20	12	12	13					
Total *1, *6	CO2 emissions (actual emissions)		41,961	36,303	38,637	38,668	38,855	39,596	39,070	37,684	-10.4%	-4.8%	-3.5%		
	CO2 emissions (post-adjustment)		41,961	35,508	37,747	38,205	37,738	39,604	39,055	37,643	-10.5%	-5.0%	-3.6%		
	Energy consumption		13,574	12,018	12,804	12,337	12,006	12,121	11,998	11,692	-13.9%	-3.5%	-2.5%		

\*1 Total CO2 emissions and energy consumption have been calculated using the receiving-end coefficient for the average of all power sources as the carbon emission factor and energy conversion coefficient, respectively. Figures for the Japan Rubber Manufacturers Association have been calculated using the coefficient for thermal power generation and a fixity coefficient for fiscal 2005 (base year) has been used to calculate actual emissions. The difference between a simple sum including relevant industries and the total is provided as "revisions".

\*2 Due to revisions in energy-specific standard calorific values and carbon emission factors under the General Energy Statistics, calculations before fiscal 1999, fiscal 2000-2004, fiscal 2005-2012, fiscal 2013, fiscal 2014 and later are based on different thermal conversion factors

\*3 Intensity indices have been calculated by having each industry set a base year, the figure for which is used as the denominator. Unless otherwise specified, the base year is fiscal 1990.

\*4 The Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention has implemented the Commitment to Low Carbon Society as a new scheme independent of the conventional Voluntary Action Plan on the Environment. Therefore, data for participating industries under the Commitment to a Low Carbon Society are available for only the years following the base year (fiscal 2012). The figures provided for fiscal 1990-2011 have been derived from the Voluntary Action Plan on the Environment as reference.

\*5 Emissions from industrial processes refer to CO2 emissions from manufacturing processes that are not energy-oriented.

\*6 Data for the Shipbuilders' Association of Japan and the Cooperative Association of Japan Shipbuilders are not included in the rate of change from fiscal 2005 to fiscal 2014 (due to lack of data for fiscal 2005).



## 2. Energy Conversion Sector

10,000t-CO<sub>2</sub>; 10,000kl crude oil equivalent; fiscal year

Industry	(※1, ※2, ※3) (※: target adopted by the industry)	Notes	2001	2002	2003	2004	2005	2009	2010	2011	2012	2013	2014	2015	Relative to FY2005	Relative to FY2013	Relative to previous FY
The Federation of Electric Power Companies	CO <sub>2</sub> emissions (actual emissions)		31,000	34,000	36,100	36,200	37,300	36,100	38,200	44,600	49,400	49,400	47,000	44,400	+19.0%	-10.1%	-5.5%
	CO <sub>2</sub> emissions (post-adjustment)		31,000	34,000	36,100	36,200	37,300	30,800	32,500	41,600	41,700	49,300	46,900	44,100	+18.2%	-10.5%	-6.0%
	CO <sub>2</sub> emission intensity index (actual emissions)		0.90	0.97	1.04	1.00	1.01	0.99	0.99	1.22	1.36	1.36	1.33	1.28	+26.2%	-5.8%	-3.4%
	CO <sub>2</sub> emission intensity index (post-adjustment)		0.90	0.97	1.04	1.00	1.01	0.85	0.84	1.14	1.15	1.36	1.32	1.27	+25.5%	-6.3%	-3.8%
	Energy consumption	(reference)	11,700	12,700	13,500	13,300	13,600	13,200	13,600	16,600	18,300	18,200	17,800	14,100	+3.7%	-22.5%	-20.8%
	Energy consumption intensity index		0.95	0.94	0.94	0.95	0.95	0.93	0.93	0.93	0.93	0.92	0.91	0.89	-6.9%	-3.4%	-2.4%
	Production activity index		1.25	1.28	1.27	1.31	1.34	1.32	1.40	1.33	1.32	1.32	1.29	1.26	-5.9%	-4.5%	-2.2%
	Portion attributable to the power industry: figures used to calculate		3346	3701	3856	3827	3855	3562	3651	4296	4612	4614	4170	4137	+7.3%	-10.3%	-0.8%
	CO <sub>2</sub> emissions (post-adjustment)		3346	3701	3856	3827	3855	3035	3098	4007	3933	4610	4159	4109	+6.6%	-10.9%	-1.2%
	Energy consumption	(reference)	2,135.9	2,196.2	2,131.3	2,191.8	2,190	2,015	2,054	1,956	1,868	1,856	1,685	1,754	-19.9%	-5.5%	+4.1%
Petroleum Association of Japan	CO <sub>2</sub> emissions (actual emissions)		4062.1	4032.2	4074.8	4054.2	4,154	3,960	4,003	3,785	3,820	4,032	3,824	3,834	-7.7%	-4.9%	+0.3%
	CO <sub>2</sub> emissions (post-adjustment)		4,062.1	4,032.2	4,074.8	4,054.2	4,154	3,945	3,987	3,775	3,795	4,032	3,823	3,833	-7.7%	-4.9%	+0.3%
	CO <sub>2</sub> emission intensity index (actual emissions)		0.88	0.88	0.88	0.87	0.85	0.85	0.84	0.85	0.85	0.86	0.85	0.83	-1.5%	-2.7%	-1.6%
	CO <sub>2</sub> emission intensity index (post-adjustment)		0.88	0.88	0.88	0.87	0.85	0.84	0.84	0.84	0.85	0.86	0.85	0.83	-1.5%	-2.7%	-1.6%
	Energy consumption	☆	1,657.3	1,650.4	1,665.2	1,665.1	1,714	1,633	1,651	1,556	1,575	1,652	1,565	1,574	-8.1%	-4.7%	+0.6%
	Energy consumption intensity index		0.87	0.87	0.87	0.86	0.84	0.85	0.84	0.84	0.85	0.85	0.84	0.83	-1.9%	-2.5%	-1.3%
	Production activity index		1.48	1.47	1.49	1.50	1.58	1.50	1.52	1.44	1.44	1.52	1.45	1.48	-6.3%	-2.3%	+1.9%
	CO <sub>2</sub> emissions (actual emissions)		72.7	66.3	58.7	53.7	47	34	34	38	40	46	48	45	-4.7%	-2.0%	-6.2%
The Japan Gas Association #4	CO <sub>2</sub> emissions (post-adjustment)		72.7	66.3	58.7	53.7	47	31	31	36	36	46	48	44	-5.2%	-2.4%	-6.5%
	CO <sub>2</sub> emission intensity index (actual emissions)	☆	0.33	0.28	0.24	0.21	0.17	0.12	0.11	0.12	0.12	0.13	0.13	0.13	-23.1%	-2.2%	-4.7%
	CO <sub>2</sub> emission intensity index (post-adjustment)		0.33	0.28	0.24	0.21	0.17	0.11	0.10	0.11	0.11	0.13	0.13	0.13	-23.5%	-2.7%	-5.0%
	Energy consumption		37.9	34.3	30.0	28.2	25	19	19	19	18	21	22	21	-14.6%	+1.1%	-4.3%
	Energy consumption intensity index	☆	0.35	0.29	0.25	0.22	0.18	0.13	0.12	0.12	0.11	0.12	0.12	0.12	-31.1%	+0.8%	-2.9%
	Production activity index		1.62	1.76	1.82	1.94	2.10	2.21	2.33	2.38	2.39	2.59	2.64	2.60	+23.9%	+0.3%	-1.5%
	CO <sub>2</sub> emissions		233	220	229	225	214	222	214	213	190	189	200	196	-8.5%	-2.2%	-2.2%
	Emissions from industrial processes #5																
Total #1	CO <sub>2</sub> emissions (actual emissions)		7,714	8,020	8,218	8,160	8,270	7,778	7,903	8,332	8,661	8,881	8,242	8,212	-0.7%	-7.5%	-0.4%
	CO <sub>2</sub> emissions (post-adjustment)		7,714	8,020	8,218	8,160	8,270	7,233	7,330	8,032	7,954	8,876	8,230	8,183	-1.1%	-7.8%	-0.6%
	Energy consumption		3,831	3,881	3,826	3,885	3,928	3,667	3,724	3,530	3,461	3,529	3,272	3,349	-14.7%	-5.1%	+2.4%

\*1 Total CO<sub>2</sub> emissions and energy consumption have been calculated using the receiving-end coefficient for the average of all power sources as the carbon emission factor and energy conversion coefficient, respectively.

\*2 Due to revisions in energy-specific standard calorific values and carbon emission factors under the General Energy Statistics, calculations before fiscal 1999, fiscal 2000-2004, fiscal 2005-2012 and fiscal 2013 are based on different thermal conversion factors.

\*3 Intensity indices have been calculated by having each industry set a base year, the figure for which is used as the denominator. Unless otherwise specified, the base year is fiscal 1990.

\*4 The data for the Japan Gas Association in and before 2012 are based on industrial boundaries defined under the Voluntary Action Plan on the Environment. The calculated CO<sub>2</sub> emissions differ from the figures derived using the marginal adjustment method (cogeneration) that the Japan Gas Association has adopted as target indices.\*5 Emissions from industrial processes refer to CO<sub>2</sub> emissions from manufacturing processes that are not energy-oriented.

## 3. Commercial Sector

10,000t-CO<sub>2</sub>; 10,000kl crude oil equivalent; fiscal year

Industry	(*1, *2, *3) (☆: target adopted by the industry)	Notes	2009	2010	2011	2012	2013	2014	2015	Relative to FY2013	Relative to previous FY
Japan Chain Stores Association	CO <sub>2</sub> emissions (actual emissions)		646	668	692	783	540	496	395	-26.9%	-20.4%
	CO <sub>2</sub> emissions (post-adjustment)		552	569	645	661	540	495	392	-27.3%	-20.7%
	Energy consumption		389	402	338	342	233	219	181	-22.2%	-17.4%
	Energy consumption intensity index ☆	Base year: FY1996	0.91	0.91	0.78	0.77	0.76	0.77	0.75	-1.7%	-3.5%
Telecommunications Carriers Association	CO <sub>2</sub> emissions (actual emissions)		453	427	532	576	571	566	555	-2.7%	-1.9%
	CO <sub>2</sub> emissions (post-adjustment)		387	363	496	486	570	565	552	-3.3%	-2.3%
	Energy consumption		273	257	260	251	246	251	254	+3.3%	+1.5%
	Energy consumption intensity index ☆	Base year: FY2010		1.00	0.97	0.90	0.85	0.84	0.78	-7.9%	-6.8%
Japan Franchise Association	Production activity index			1.00	1.05	1.09	1.15	1.18	1.29	+12.2%	+9.0%
	CO <sub>2</sub> emissions (actual emissions)			297	364	422	438	459	452	+3.1%	-1.5%
	CO <sub>2</sub> emissions (post-adjustment)			253	339	357	438	457	449	+2.4%	-1.9%
	Energy consumption			179	178	184	189	203	207	+9.4%	+1.9%
Japan Department Store Association	CO <sub>2</sub> emissions (actual emissions)		161	147	168	183	179	161	149	-16.5%	-7.1%
	CO <sub>2</sub> emissions (post-adjustment)		140	128	158	157	179	160	148	-17.0%	-7.5%
	CO <sub>2</sub> emission intensity index (actual emissions)		0.82	0.79	0.88	0.96	0.94	0.87	0.79	-16.5%	-9.5%
	CO <sub>2</sub> emission intensity index (post-adjustment)		0.72	0.69	0.83	0.83	0.94	0.87	0.78	-17.0%	-9.9%
	Energy consumption		94	86	82	81	78	72	69	-11.8%	-3.9%
	Energy consumption intensity index ☆		0.80	0.77	0.71	0.70	0.68	0.64	0.60	-11.8%	-6.4%
	Production activity index		1.86	1.76	1.81	1.81	1.81	1.76	1.81	+0.0%	+2.7%
Japan Association of Refrigerated Warehouses	CO <sub>2</sub> emissions (actual emissions)		76.3	80	90	106	106	103	98	-7.7%	-4.9%
	CO <sub>2</sub> emissions (post-adjustment)		65.2	68	84	90	106	103	98	-8.3%	-5.3%
	CO <sub>2</sub> emission intensity index (actual emissions)		0.88	0.92	1.08	1.22	1.20	1.15	1.09	-9.1%	-4.9%
	CO <sub>2</sub> emission intensity index (post-adjustment)		0.76	0.78	1.00	1.03	1.20	1.14	1.08	-9.6%	-5.3%
	Energy consumption		45.9	48	44	46	46	46	45	-2.0%	-1.6%
	Energy consumption intensity index ☆		0.83	0.86	0.82	0.83	0.81	0.79	0.78	-3.5%	-1.6%
	Production activity index		1.39	1.40	1.35	1.40	1.43	1.45	1.45	+1.5%	-0.1%
Japanese Bankers Association	CO <sub>2</sub> emissions (actual emissions)		121.2	122	130	141	139	134	127	-9.0%	-5.7%
	CO <sub>2</sub> emissions (post-adjustment)		103.5	104	121	119	139	134	126	-9.6%	-6.1%
	Energy consumption		72.9	73	64	62	60	59	58	-3.4%	-2.4%
	Electric power consumption intensity (power consumption / total floor area) ☆		1.000	0.99	0.86	0.84	0.83	0.82	0.80	-3.7%	-2.2%
The Life Insurance Association of Japan	CO <sub>2</sub> emissions (actual emissions)		107.5	105	112	119	114	105	99	-13.6%	-5.8%
	CO <sub>2</sub> emissions (post-adjustment)		93.8	91	105	103	114	105	98	-14.1%	-6.2%
	Energy consumption ☆		62.9	61	54	53	50	47	45	-9.0%	-2.9%
	Production activity index	Base year: FY2009	1.00	0.96	0.97	0.94	0.91	0.89	0.89	-2.6%	-0.5%
Japan Foreign Trade Council Inc.	CO <sub>2</sub> emissions (actual emissions)		5.1	5.3	5.4	5.6	5.4	5.1	4.4	-18.0%	-13.3%
	CO <sub>2</sub> emissions (post-adjustment)		4.4	4.5	5.0	4.8	5.4	5.1	4.4	-18.5%	-13.6%
	Energy consumption		3.0	3.1	2.6	2.5	2.4	2.3	2.0	-13.3%	-10.5%
	Electric power consumption poer unit floor area in entire company) ☆	Base year: FY2009	1.00	1.01	0.84	0.79	0.78	0.76	0.76	-2.5%	+0.3%
The General Insurance Association of Japan	CO <sub>2</sub> emissions (actual emissions)		27.2	27	28	31	30	28	26	-13.1%	-8.0%
	CO <sub>2</sub> emissions (post-adjustment)		23.7	23	27	26	30	28	26	-13.5%	-8.4%
	Energy consumption		15.92	16	14	13	13	13	12	-8.3%	-5.1%
	Electric power consumption intensity (power consumption/total floor area) ☆	Base year: FY2009	1.0	1.01	0.87	0.85	0.85	0.87	0.84	-0.9%	-3.1%
	Production activity index		1.00	0.98	0.98	0.97	0.95	0.91	0.89	-6.4%	-2.1%
Japan LP Gas Association	CO <sub>2</sub> emissions (actual emissions)		2.4	2.4	2.9	3.2	3.1	3.0	2.8	-8.6%	-4.9%
	CO <sub>2</sub> emissions (post-adjustment)		2.0	2.0	2.7	2.7	3.1	3.0	2.8	-9.1%	-5.3%
	CO <sub>2</sub> emission intensity index (actual emissions)		0.98	0.97	1.16	1.39	1.44	1.36	1.41	-2.0%	+3.5%
	CO <sub>2</sub> emission intensity index (post-adjustment)		0.83	0.83	1.08	1.17	1.44	1.36	1.40	-2.6%	+3.0%
	Energy consumption		1.4	1.4	1.4	1.4	1.3	1.3	1.3	-2.9%	-1.6%
	Energy consumption intensity index ☆		0.91	0.91	0.88	0.94	0.97	0.94	1.00	+4.0%	+7.1%
The Real Estate Companies Association of Japan	Production activity index		1.0	0.99	1.00	0.93	0.87	0.88	0.81	-6.7%	-8.1%
	CO <sub>2</sub> emissions (actual emissions)		0.76	0.75	0.84	0.85	0.99	0.93	0.87	-12.4%	-7.2%
	CO <sub>2</sub> emissions (post-adjustment)	Base year: FY2005	0.87	0.86	0.89	0.97	0.99	0.93	0.87	-12.4%	-7.2%
	Energy consumption intensity index ☆		0.89	0.88	0.79	0.79	0.78	0.74	0.73	-6.3%	-2.0%
Japan Securities Dealers Association	CO <sub>2</sub> emissions (actual emissions)		19.2	19	19	20	19	18	17	-12.6%	-5.9%
	CO <sub>2</sub> emissions (post-adjustment)		16.4	16	18	17	19	18	17	-13.1%	-6.3%
	Energy consumption		11.5	11	9	9	8	8	8	-7.2%	-2.6%
	Electric power consumption per unit floor area ☆	[kWh/m <sup>2</sup> ]	241	243	203	195	189	185	180	-5.2%	-3.1%
	* intensity index of above	Base year: FY2009	1.00	1.00	0.84	0.80	0.78	0.76	0.74	-5.1%	-2.6%
日本ホテル協会	CO <sub>2</sub> emissions (actual emissions)			61	62	67	65	64	66	+1.5%	+3.3%
	CO <sub>2</sub> emissions (post-adjustment)			56	60	60	65	64	65	+1.1%	+3.0%
	Energy consumption			33	30	30	29	29	31	+5.0%	+5.3%
	Energy consumption intensity index ☆	Base year: FY2010		1.00	0.93	0.92	0.91	0.88	0.88	-3.1%	-0.0%
Total *1	Production activity index			1.00	1.00	1.02	1.03	1.04	1.04	+0.9%	+0.4%
	CO <sub>2</sub> emissions (actual emissions)		1,618	1,960	2,206	2,457	2,210	2,142	1,991	-9.9%	-7.1%
	CO <sub>2</sub> emissions (post-adjustment)		1,388	1,678	2,062	2,084	2,209	2,136	1,978	-10.5%	-7.4%
	Energy consumption		969	1,171	1,077	1,075	956	949	913	-4.5%	-3.8%

\*1 Total CO<sub>2</sub> emissions and energy consumption have been calculated using the receiving-end coefficient for the average of all power sources as the carbon emission factor and energy conversion coefficient, respectively.

\*2 Due to revisions in energy-specific standard calorific values and carbon emission factors under the General Energy Statistics, calculations before fiscal 1999, fiscal 2000-2004, fiscal 2005-2012 and fiscal 2013 are based on different thermal conversion factors.

\*3 Intensity indices have been calculated by having each industry set a base year, the figure for which is used as the denominator.

## 4. Transportation Sector

10,000t-CO<sub>2</sub>; 10,000kl crude oil equivalent; fiscal year

Industry	(※1, ※2, ※3) (※: target adopted by the industry)	Note	2005	2009	2010	2011	2012	2013	2014	2015	05年度比	13年度比	前年度比
The Japanese Shipowners' Association	CO <sub>2</sub> emissions (actual emissions)		5,574	5,751	5,769	5,673	5,499	5,539	5,417	5,215	-6.4%	-5.9%	-3.7%
	CO <sub>2</sub> emissions (post-adjustment)		5,574	5,751	5,769	5,673	5,499	5,539	5,417	5,215	-6.4%	-5.9%	-3.7%
	CO <sub>2</sub> emission intensity index (actual emissions)	☆	0.88	0.82	0.83	0.77	0.73	0.62	0.57	0.59	-32.4%	-3.8%	+4.4%
	CO <sub>2</sub> emission intensity index (post-adjustment)		0.88	0.82	0.83	0.77	0.73	0.62	0.57	0.59	-32.4%	-3.8%	+4.4%
	Energy consumption		2,012	2,076	2,083	2,048	1,986	1,931	1,889	1,821	-9.5%	-5.7%	-3.6%
	Energy consumption intensity index		0.88	0.82	0.83	0.77	0.73	0.59	0.55	0.57	-34.7%	-3.6%	+4.5%
	Production activity index		1.65	1.81	1.79	1.91	1.95	2.33	2.48	2.28	+38.5%	-2.1%	-7.8%
Japan Trucking Association	CO <sub>2</sub> emissions (actual emissions)		4,720	4,470	4,337	4,161	4,101	4,079	4,100	4,091	-13.3%	+0.3%	-0.2%
	CO <sub>2</sub> emissions (post-adjustment)		4,720	4,470	4,337	4,161	4,101	4,079	4,100	4,091	-13.3%	+0.3%	-0.2%
	CO <sub>2</sub> emission intensity index (actual emissions)	☆	0.75	0.71	0.63	0.64	0.71	0.69	0.71	0.73	-2.7%	+5.8%	+2.8%
	CO <sub>2</sub> emission intensity index (post-adjustment)		0.75	0.71	0.63	0.64	0.71	0.69	0.71	0.73	-2.7%	+5.8%	+2.8%
	Energy consumption		1,776	1,682	1,632	1,566	1,543	1,527	1,534	1,531	-13.8%	+0.3%	-0.2%
	Energy consumption intensity index		0.75	0.71	0.63	0.64	0.71	0.68	0.70	0.72	-4.0%	+5.9%	+2.9%
	Production activity index		1.25	1.26	1.37	1.30	1.16	1.18	1.16	1.13	-9.6%	-4.2%	-2.6%
The Scheduled Airlines Association of Japan	CO <sub>2</sub> emissions (actual emissions)		2,667	2,106	1,901	1,753	1,884	1,979	2,086	2,150	-19.4%	+8.6%	+3.1%
	CO <sub>2</sub> emissions (post-adjustment)		2,667	2,106	1,901	1,753	1,884	1,979	2,086	2,150	-19.4%	+8.6%	+3.1%
	CO <sub>2</sub> emission intensity index (actual emissions)	☆	0.97	0.90	0.86	0.86	0.86	0.85	0.81	0.81	-16.1%	-4.7%	+0.2%
	CO <sub>2</sub> emission intensity index (post-adjustment)		0.97	0.90	0.86	0.86	0.86	0.85	0.81	0.81	-16.1%	-4.7%	+0.2%
	Energy consumption		1,026	810	731	674	724	748	789	813	-20.7%	+8.6%	+3.1%
	Energy consumption intensity index		0.97	0.90	0.86	0.86	0.86	0.84	0.80	0.80	-17.5%	-4.7%	+0.2%
	Production activity index		1.60	1.36	1.29	1.19	1.27	1.35	1.49	1.54	-3.9%	+14.0%	+2.9%
Japan Federation of Coastal Shipping Associations	CO <sub>2</sub> emissions (actual emissions)	☆	789	655	704	686	704	722	726	704	-10.8%	-2.5%	-3.0%
	CO <sub>2</sub> emissions (post-adjustment)		789	655	704	686	704	722	726	704	-10.8%	-2.5%	-3.0%
	CO <sub>2</sub> emission intensity index (actual emissions)		1.04	1.09	1.09	1.10	1.11	1.09	1.11	1.09	+4.6%	-0.2%	-1.7%
	CO <sub>2</sub> emission intensity index (post-adjustment)		1.04	1.09	1.09	1.10	1.11	1.09	1.11	1.09	+4.6%	-0.2%	-1.7%
	Energy consumption		288	239	256	250	256	255	256	249	-13.7%	-2.5%	-2.9%
	Energy consumption intensity index		1.04	1.09	1.09	1.09	1.10	1.06	1.07	1.05	+1.3%	-0.1%	-1.6%
	Production activity index		0.88	0.70	0.75	0.73	0.74	0.77	0.76	0.75	-14.7%	-2.3%	-1.4%
The Association of Japanese Private Railways	CO <sub>2</sub> emissions (actual emissions)				216	257	289	286	274	263		-8.1%	-4.2%
	CO <sub>2</sub> emissions (post-adjustment)				184	240	244	286	274	261		-8.7%	-4.6%
	Energy consumption				130	126	126	123	121	120		-2.4%	-0.9%
	Energy consumption intensity index				1.00	0.97	0.97	0.95	0.93	0.93		-2.4%	-0.9%
	Production activity index				1.00	0.99	1.00	1.00	1.01	1.01		+0.4%	+0.1%
Shikoku Railway Company	CO <sub>2</sub> emissions (actual emissions)		8	8	7	7	8	8	8	8	-8.0%	-4.0%	-0.5%
	CO <sub>2</sub> emissions (post-adjustment)		8	7	7	7	8	8	8	8	-8.3%	-4.2%	-0.6%
	CO <sub>2</sub> emission intensity index (actual emissions)	☆	0.78	0.73	0.75	0.78	0.84	0.85	0.83	0.81	+3.9%	-4.0%	-1.8%
	CO <sub>2</sub> emission intensity index (post-adjustment)		0.78	0.70	0.71	0.76	0.79	0.85	0.83	0.81	+3.6%	-4.2%	-1.9%
	Energy consumption		4	3	3	3	3	3	3	3	-15.5%	-1.6%	+0.9%
	Energy consumption intensity index		0.85	0.80	0.82	0.80	0.82	0.82	0.81	0.81	-4.6%	-1.7%	-0.5%
	Production activity index		1.13	1.12	1.06	1.02	1.01	1.00	0.99	1.00	-11.5%	+0.0%	+1.3%
All Japan Freight Forwarders Association	CO <sub>2</sub> emissions (actual emissions)	☆	14.1	13.3	12.8	12.7	12.8	12.9	12.9	12.7	-9.7%	-1.7%	-1.4%
	CO <sub>2</sub> emissions (post-adjustment)		14.1	13.3	12.8	12.7	12.8	12.9	12.9	12.7	-9.7%	-1.7%	-1.4%
	Production activity index		45,814	45,814	45,814	45,814	45,814	45,814	45,814	45,814		+0.0%	+0.0%
Revisions ※1	*CO <sub>2</sub> emissions (actual emissions)		249	238	233	318	347	413	404	394			
	*CO <sub>2</sub> emissions (post-adjustment)		249	205	201	298	296	413	403	392			
Total ※1 ※4	CO <sub>2</sub> emissions (actual emissions)		14,022	13,239	13,179	12,868	12,844	13,039	13,027	12,836	-11.1%	-1.6%	-1.5%
	CO <sub>2</sub> emissions (post-adjustment)		14,022	13,206	13,114	12,830	12,748	13,038	13,025	12,832	-40.2%	-1.6%	-1.5%
	Energy consumption		5,219	4,920	4,944	4,793	4,763	4,739	4,744	4,689	-12.5%	-1.1%	-1.2%

\*1 Total CO<sub>2</sub> emissions and energy consumption have been calculated using the receiving-end coefficient for the average of all power sources as the carbon emission factor and energy conversion coefficient, respectively.

\*2 Due to revisions in energy-specific standard calorific values and carbon emission factors under the General Energy Statistics, calculations before fiscal 1999, fiscal 2000-2004, fiscal 2005-2012 and fiscal 2013 are based on different thermal conversion factors.

\*3 Intensity indices have been calculated by having each industry set a base year, the figure for which is used as the denominator. Unless otherwise specified, the base year is fiscal 1990.

\*4 Data for the Association of Japanese Private Railways are not included in the rate of change from fiscal 2005 to fiscal 2014 (due to lack of data for fiscal 2005).